40p EVERY WEEK · No 80 · SEPT 29 1984

PERSONAL Computer NEWS

PCN EXPOSÉ
The truth about software piracy

SPECTRUM WAFADRIVES

More power, more storage, more reliability

DO IT...
Free programs for 64, BBC, Spectrum, QL & Oric

SOLVE IT...
Hints, tips & routines for Spectrum, Amstrad & QL

PLAY IT...
New games for BBC, 64 & Amstrad

GET IT...
This week in your action-packed PCN

ALL-IN-ONE

Spectrum owners! Imagine what great use you could make of all these components. Rotronics have integrated them all into one attractively styled, compact unit. All the power and convenience of floppy disk can now be yours, but at a fraction of the cost.

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Wafadrive is extremely versatile. Five major components are housed within this one unit – the micro interface, two 128K drives, RS232 serial and Centronics parallel ports. Also included in the package are a blank wafer and Spectral Writer – a superb word processor program. The micro interface forms the nerve centre of Wafadrive, controlling all its major functions. The dual drive configuration and the ability to connect standard peripherals directly provides professional system flexibility. All this without a mass of separate components and vulnerable cables. Wafadrive transforms your Spectrum into a very powerful system.

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Wafadrive provides intelligent file handling and rapid access to data. Program development and other applications can be performed with ease. Start word processing immediately with the specially developed software package included with Wafadrive. Or battle with a spectacular interactive games program. Whatever your mood, you'll find the sophisticated Wafadrive software challenging and rewarding. Future versions of Wafadrive will be available for most popular home micros, so software back-up will be comprehensive.

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ALL-IN-ONE PRICE £129.95 (Inc. VAT)

Available from all Spectrum dealers, Grattan catalogue and SMT mail order.
Trade enquiries: Micro Dealer (UK) Ltd., 29 Burrowfield, Welwyn Garden City, Herts. Tel: (07073) 28181.

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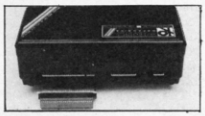

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MONITOR

Wherever it happens, if it affects you, we report it in the Monitor pages. Home news, events and analyses, with regular columns from where technology makes waves — the USA and Japan. Plus a regular look at the British micro scene in Home Front.

MSX opens second front

MSX hoisted its standard in Europe last week but machines for the UK are still a month or two away.

The British launch of the MSX-standard systems took place a safe distance away in the south of France. All the major companies involved in the MSX project were represented and a number of machines were on show.

Toshiba was the only company to have actually delivered any microcomputers to British dealers and these should be on sale in a few stores already.

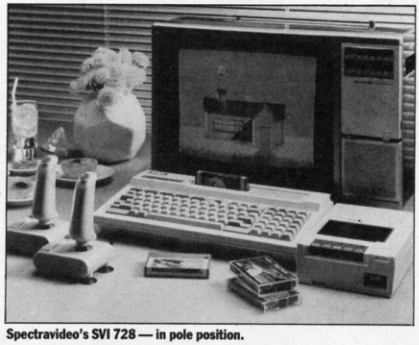
Many other companies still can't promise delivery of their MSX machines until November, while others are holding back until spring next year as they won't be able to provide enough machines for the expected demand and don't wish to get dealers' backs up.

Spectravideo was noticeable by its absence at the launch. You may remember that Spectravideo launched what was supposed to be a machine that met the MSX specification around February this year. Unfortunately the MSX spec was changed after the Spectravideo was designed; now the SVI 728 is due to be launched in October and this will be compatible with the new standard.

A spokesman for JVC summed up MSX by comparing it to the hi-fi trade. You can walk into a shop selling record players and cassette recorders and know that all of them will play the same records and cassettes.

Obviously companies such as JVC, Mitsubishi, Sanyo and Toshiba, who are already selling this type of product, see the advantage of manufacturing a compatible product.

The presence of a large number of magazines like *Woman's Own* and *Options* at the launch confirms that MSX is not aimed at the computer enthusiast but rather at the same market as hi-fi's, washing machines and video recorders.



Spectravideo's SVI 728 — in pole position.

Audiogenic sets software trend

Commodore specialist Audiogenic is backing a hunch that software will be given away free in the future.

It plans to launch a storage system for the Commodore 64 complete with free software, at about a third of the price of a Commodore disk drive.

'There will be bubble-gum software turning over quickly and cheaply and the more sophisticated stuff will be coming with the hardware,' Audiogenic's Martin Maynard predicted. His company has already branched out into selling peripherals with the Koala graphics pad; now it is preparing a wafer-type storage system with software accompaniment.

'I think software's going to be even cheaper,' he said, illustrating the point with telesoftware on radio and the packages available through networks like Compunet and Micronet. 'It's been a long, hot summer and I think you'll find that a large number of companies will find that it's too hot and will move out.'

MONITOR

IN BRIEF

The corporation that brought you spiralling telephone bills and the Abominable Buzby is going in for cheap software.

British Telecom, through a label called Firebird, will have £2.50 games for the Spectrum, Vic 20 and Commodore 64, and BBC Micro in the shops by mid-October.

Something nasty could be crawling into your Christmas stocking this year if Quicksilva has anything to do with it.

The self-styled Game Lords launched titles like Zombie Zombie, Blood and Guts, and Strontium Dog — The Killing last week. These and others for the Spectrum, Commodore 64 and Atari will be available soon. Zombie Zombie is the follow-up to Ant Attack.

Mainframe maker Sperry Univac has found that old habits die hard. It has launched a portable PC that weighs 38lbs. Pickfords is thought to be bidding for UK distribution rights.

Newcomer Tatung has added features to its Einstein to spruce up the display and operating range.

The company has brought out a high resolution 12in monitor, an 80-column card to make best use of it, and a version of BBC Basic to run under its own Xtal DOS.

IBM-compatibility on Acorn's 310.

You'd have needed Steve Austin's bionic legs to survive the course at the seventh *PCW* Show last week.

With three floors of an old furniture emporium to spread over, the companies that mattered were all there to show off their wares. Among the biggest and most elaborate stands were Acorn, Atari, Sinclair and Commodore, but Microvitec's cub jungle took the biscuit.

Thanks to the miracles of modern reporting we were able to bring you news of some of the likely show-stoppers last week — notably Acorn's ABC Business Computers.

Bionic Acorn heads the cast

That rare bird, the MSX machine, surfaced at the show. Tucked away in the corner of Microdealer UK's stand was an MSX Goldstar, a 64K micro with a Z80, MSX Basic, and 32K of RAM for around £230.

The Goldstar comes with a built-in recorder, a programmable sound generator, several graphics modes and 16 colours. When it comes is another matter, but Microdealer UK hopes to have systems in full supply before Christmas. The software distributor is the sole distributor for the machine in the UK.

Amstrad was able to put a firmer date on its disk units. These should be available by late November, for £199.95 each — the price also buys you CP/M and Logo. The drives are called DDI-1s; they're 3in units along the lines of the Hitachi standard, with up to 178K file capacity.

On the stand the drives were safe from prying hands, set into the moulding of a partition or gleaming behind a glass panel. Commodore also was taking no chances, placing the systems around its stand under restraint with sturdy clamps. There were no such limitations on software catalogues for the C16 and Plus/4 — perhaps responding to press doubts about the availability of software for the new pair, Commodore has been stung into providing solid evidence.

Across the gangway from Commodore, Acorn was demonstrating almost as many systems as the C16 has software titles. The eight pieces of its ABC range drew interested crowds throughout the show. Not even the Chinese water torture of a leaking roof could dampen Acorn's enthusiasm, but ACT's Roger Foster may have a point when he predicted that Acorn had as good a chance of breaking into the business market as ACT has of getting into education.

The ABC systems (issue 79) take Acorn's habit of adding processors to the BBC board to new lengths. As a result they are BBC-compatible, but another effect is that they have a less robust feel than most business systems.

January can't come too soon for Enterprise; this Jekyll and Jekyll company now faces another delay in bringing its Enterprise 64 to market. The kindest thing that anybody could have done at the show would have been to designate its space on the upper floor a Regional Enterprise Zone and give it Government grants, but

VIEW FROM AMERICA

Through a cab window darkly

By Chris Rowley

New York taxi cabs enjoy a world wide reputation for a kind of grim charm.

New Yorkers are used to it, toughened by years of bizarre traffic conditions. Even they have their limits however. Now some drivers are experimenting with a 2ft by 3in LED panel driven by a micro under the dash that pumps ad slogans into the back seat while you meander through the gridlock. The gleaming letters are only 17ins away from your eyes and are hard to ignore as they advise you to drink 'Kronenborg', 'See La Cage aux Folles', listen to 'News 88', etc.

Maybe all new cabs will be wired up so that as soon as you open the door the ads begin. Maybe they'll add audio chips too. Maybe the mayor will come to his senses and bid the taxi and limousine commission do something to stop this horror before it gets out of hand. After all, it won't be long before those Large Area Flat Panel LCD screens arrive on the scene.

There were a few shudders at prestigious auditors Peat Marwick when they checked Kaypro's inventory recently. Apparently Kaypro was so overwhelmed with parts shipments it ran out of room in the warehouse. So Kaypro set up a circus Big Top on a bluff overlooking the Pacific Ocean outside San Diego, and filled it with chips, screens, disk drives, circuit boards etc. Security and accounting practices were reportedly none too tight and as much as $6 million may be missing from the total inventory of $60 million.

Texas Instruments was the scene of some frantic scrambling to minimise negative media exposure when the defective chip testing procedures story hit the fan. Instead of actually performing those hundreds of tests on the myriads of chips now installed in Americas F15's and Sidewinders etc, many chip makers have simply shipped potentially defective chips to the Pentagon.

Horror stories keep surfacing. As many as a third of the navy's Sparrow missiles and quarter of its Sidewinders are now regarded as 'useless'.

Texas Instruments resented being singled out. A spokesman said 'The question is: was the paper work done properly and were the tests done according to specifications?' But the company acknowledged that some chips leaving its Midland, Texas plant might not have been tested in accordance with the Defence Department's rigid specifications.

Other industry observers backed Texas Instruments. 'These are hardly isolated incidents,' said Judith Larsen of Cognos Associates.

Another kind of horror story came to light when Richard Perle, the persistent Secretary of Defence in the Reagan administration, said that he believed that the Apple II is a good example of a readily available, modern computer of military value to the Eastern Block. He even seems to believe the US uses such a computer to target its own nuclear weapons. You didn't know there were people in the Reagan administration who were this badly informed, did you?

Meanwhile the first findings from an NYU study of the effect of home computers on American family life came to light. Twenty families with 40 children ranging from three to 18 were surveyed. Commodore 64's were the most commonly owned computer followed by Apple II's and TRS-80's. One family had an IBM PC.

Some refused to allow children with computers to use them for homework. In some cases school officials cited the social inequity involved. The report noticed that this may be only the beginning of an explosive issue in US schools as students are divided into the computer haves and have nots.

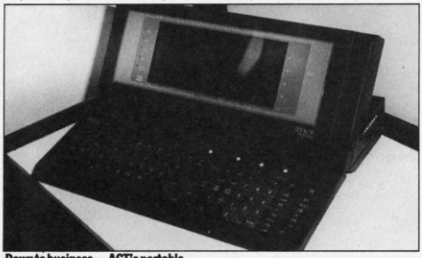
Finally we should note that October has been designated 'Computer Learning Month' by the US senate. After all this is an election year.

MONITOR

according to Enterprise's Michael Shirley the company's backers are not losing patience.

The machine (64K of RAM and due to go out with 48K of ROM) was originally launched last September, to be on sale by April of this year. The company at that time was called Elan. Later it became Flan, and then Enterprise, which kept everybody entertained while its machine steadfastly refused to appear. Now it is due in January next year. The company's backers must have the patience of Chris Tavare, and so far its income has not troubled the accountants.

The problem lies in the graphics chip. Shirley said that the system would still hold its own when it appears, despite the delays — 'We're not going to be overtaken overnight,' he claimed, adding bravely: 'I don't think we've got a credibility problem because we've not hyped the market during the many months of delay.'



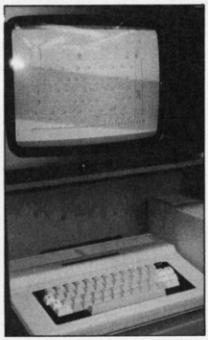
Down to business — ACT's portable.

Apart from the increased ROM the only change to the Enterprise 64's original spec (issue 29) is in its price — it will cost £249 if you ever get the chance to buy one.

Elsewhere the unexpected lurked around every corner: a large part of the Atari stand was given to the 'discontinued' 600XL; Tandy was showing Colour Computers with bright new keyboards; Crystal Software had changed its name to Design Design and had a pre-production version of Dark Star running smoothly.

The BBC's Chip Shop stand proved one of the most popular, with its events punctuating the days and with appearances from presenters and celebrities. ACT, displaying the Portable Apricot (wasn't the original supposed to be portable?), seemed to have come to the wrong place — its constant taped presentation would have been more at home at the Which Computer? Show.

But anything went at Olympia 2, and most of it probably did. Why Olympia 2? Why not Parnassus or Ida as a name for the hall? Perhaps because Olympia 2 makes it sound more like an old furniture emporium.



Tandy's shop-window — new keyboards for the Colour Computer.

We'll round off our coverage of the seventh *PCW*Show next week with a report on the *PCN* prize winners.

HOME FRONT

BMX raiders on the horizon

By David Guest

Widespread drought, dwindling coal stocks, a fearful hammering from the West Indians, it wasn't much of a summer. And to add to the list of woes, sales of home micros have fallen sharply.

Bikes are to blame, according to a consumer research group called AGB Home Audit. While sales of BMX bikes have leapt by 76 per cent, home micro makers have had to come to terms with a 30 per cent drop in sales. AGB's explanation is startlingly obvious — in fine weather you prefer to be on your bike, in a manner of speaking.

But BMX bikes have more in common with micros than might at first appear. For example, the bike by itself is hardly enough; you have to buy the add-ons as well — the protective clothing, the crash helmets. Then there are the further capital investments that you need to make the most of your bike — a spot of concrete landscaping in the garden, an abrupt leap in the personal insurance premium.

Besides which, BMX bikes have certain disadvantages beyond the fact that you can't destroy mutant alpacas with them (unless you live in the high Andes, where jaywalking alpacas are a common hazard). The risk of personal damage is greater. Apart from an early scare over Specrum power supplies, who ever heard of anybody being admitted to the casualty department after a session on an arcade game?

The answer for hard-pressed micro makers is obviously to sell a BMX simulation game with their machines, and indeed this has started to happen. But the Japanese, never ones to miss a trick, have gone the whole hog. They have brought the BMX standard micro to Europe.

You'll have read about BMX machines. In association with Microsoft several Japanese manufacturers have built machines to a common standard, with Z80 processors and BMX Basic. The idea is that lots of people will buy them (perhaps 76 per cent more than last year) and lots of Japanese companies will make a killing.

With this in prospect, several software houses — the number runs to 40 at the last count — are busy producing BMX software. This will run on any BMX machines indiscriminately. As launched in Europe last week there are seven BMX micros soon to be available in the UK — the Seven Dwarfs.

Commodore users will agree that it is a wonderful thing, a standard that will let you run any piece of software on any one of seven micros. It might also justify a higher price on the software — after all, if it will run on so many different systems it is so much more valuable.

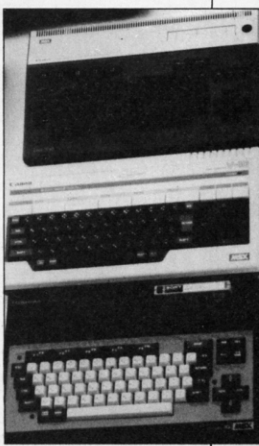
But standardisation helps the suppliers at least as much as it helps the users. The average user — take yourself, as a random example — will not own seven different micros. More often than not you'll have a relatively modest collection — say, one micro. Under these circumstances it will be a matter of complete indifference to you how many other machines your game can run on — unless, heaven forbid, you're selling copies of it to your friends with other BMX micros.

So the software suppliers have seven chances of making a sale where previously they might have throught themselves lucky to have two — the Oric 1 and the Atmos, for example.

With this in mind, look at the range of prices that software companies are quoting on BMX software. It runs from £1.99 (God bless Mastertronic) to £11.95.

Then look back at the early days of Amstrad software, where software companies had only one machine to aim at. Amsoft set a price of £8.95, well over the odds if you're used to prices on other popular machines. With Amstrad too there have been renegades who wouldn't toe the high-price line — Kuma is one.

So what difference will standardisation make to you? On the face of it, none. Eventually it may mean a wider choice, but as with any new micro that will depend on how well the new micros sell. When the BMX micros finally get into the shops you may begin to see software prices dropping. But until then, ask yourself exactly who the BMX bandits are.



After BMW, BMX — the standard to put some pep back into micros.

Piracy — who's ripping-off who?

By David Guest

Hands up anybody who's never copied a piece of software.

If your hand is down you will be startled to learn that you're costing UK software producers £66 million a year. If your hand is up, better put the other one up as well and surrender. Where copying is concerned, you're guilty until proved innocent.

Guilty of what? That's a question that the software suppliers are answering as they go along. They regard pirates as leeches that are bleeding them white, but while some are out to hammer only the commercial counterfeiters, one or two are loosing off at anything that moves. You could find yourself in the firing line.

Many of the techniques they use to discourage copying make no distinction between legitimate and illegitimate operations — those that stop you backing up a piece of software for your own purposes. In this area the video industry could teach the software industry some lessons, but the software producers only really woke up to piracy this year.

It happened at around the turn of the year. Christmas was a boom time for micro sales and everybody expected a flood of software sales in the new year. Winter thawed but the flood didn't come, and summer has seen some well-known names disappear.

It is everybody's problem when companies start to go out of business. For you, as the 500 software producers of the micro business's heady days slim down to around 350, it means less choice. But is piracy the sole cause?

'It's like cigarettes — somebody hands round the pack and you take one. Later you hand out yours.'

Nobody will publicly admit the other glaring possibility — that consumers stopped buying software because too much of it was over-priced and unimaginative. But that hardly matters; piracy has been identified as the problem, and piracy is going to be tackled.

The lead has come from individuals like Jim Lamont, whose celebrated anti-copying mechanism fell foul of the Ministry of Defence on obscure grounds last spring. Now the running has been taken up by industry groupings like the Guild of Software Houses (GOSH) and the Federation Against Software Theft (FAST).

Nick Alexander, managing director of Virgin Software and chairman of GOSH, reckons that all forms of piracy cost the industry about £100 million a year. That's about 16 million copied games, and almost £300,000 stolen from each software house.

About a third of this he puts down to commercial counterfeiting — the rest is what they call 'casual copying'. The spotlight at the moment is on large scale commercial operations, where the cost of producing a forged tape and cassette inlay can be as little as 20p or 30p. The product can then be sold from a market stall for a couple of pounds or passed off as genuine and sold at the normal retail price. 'The counterfeits we have seen are very good,' according to A&F Software's managing director Mike Fitzgerald.

'When I was at school I didn't get much pocket money, so with three or four friends I used to swap games. We were spending all the money we had on software.'

Street markets seem to be the main outlet for forgeries and they can be the start of the trail that leads Trading Standards Officers like Ian Lavender in Humberside to the counterfeiter.

'I've never bought a game in my life.'

'I heard Nick Alexander on the radio and decided that I needed to get properly sorted out before it took off,' he said. 'One of my concerns about software was that it would follow video and infiltrate into legitimate retail outlets.'

So far the involvement of TSOs has been intermittent, and Lavender adds: 'We can only take action on hard information.' He backs FAST's campaign for changes in the law (along the lines of video piracy, where fines of £2,000 and up to two years in prison can be handed down), but he warns that software houses could do more to protect themselves.

One of the most aggressive is Microdeal. John Symes, managing director, told us: 'We are currently pursuing three cases; one involves a large user group and another a school where the teachers are actually allowing it to happen.'

This is where the focus starts to shift from commercial piracy to the home front, and where the attitude to an annual loss of £66 million becomes less casual. 'Here am I, trying to sign up as the distributor for a new game and it's already going around the local schools,' Symes complained.

In a different case, where Atari software was involved, this kind of situation led to a dawn raid, threats of prosecution, and some very anxious weeks for the alleged pirate.

'There should be a Buyer's Charter or something, to let you do what you want with something you've paid money for.'

User groups, schools, in fact anybody who copies a tape could be vulnerable to action. It doesn't make any difference.

If the software houses and their associations score a success in tackling the large-scale counterfeiters you can be sure they won't stop there. For them it won't seem like a lowering of their sights, with twice as much money involved.

From The Sea Hawk by courtesy of Warner Brothers.

Splice the main tape! There's less romance but just as fierce a struggle as the software houses try to repel boarders.

CHARTS

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Daley's Decathlon	Ocean	SP, C64	£7.90
2	2	Monty Mole	Gremlin	SP, C64	£6.95
3	4	Full Throttle	Micromega	SP	£6.95
4	10	Lords of Midnight	Beyond	SP	£9.95
5	3	Decathlon	Activision	C64	£9.99
6	6	Match Point	Psion	SP	£7.95
7	7	Sabre Wulf	Ultimate	SP	£9.95
8	5	Beach Head	US Gold	SP, C64, AT	£9.99
9	10	Jet Set Willy	Soft Projects	SP	£5.95
10	8	Micro Olympics	Database	SP, C64, AC	£6.95
11	12	Arabian Nights	Interceptor	C64	£7.00
12	—	Sherlock Holmes	Melbourne	SP	£14.95
13	15	Mugsy	Melbourne	SP	£6.95
14	11	TLL	Vortex	SP	£5.95
15	16	Astro Chase	Statesoft	C64	£8.95
16	—	Int. Soccer	Commodore	C64	£9.95
17	—	World Cup	Artic	SP	£6.95
18	—	Trashman	N. Generation	SP, C64	£5.95
19	—	Football Manager	Addictive	SP, C64, AC	£6.95
20	—	Worse Things Happen	Silversoft	SP	£6.95

SPECTRUM

TW	TITLE	PRICE
1	Daley's Decathlon	£7.90
2	Monty Mole	£6.95
3	Lords of Midnight	£9.95
4	Full Throttle	£6.95
5	Sabre Wulf	£9.95
6	Jet Set Willy	£5.95
7	Match Point	£7.95
8	Mugsy	£6.95
9	Micro Olympics	£6.95
10	Sherlock Holmes	£14.95

COMMODORE

TW	TITLE	PRICE
1	Beach Head	£9.99
2	Daley's Decathlon	£7.90
3	Monty Mole	£6.95
4	Decathlon	£9.99
5	Astro Chase	£8.95
6	Hero	£9.99
7	Arabian Nights	£7.00
8	Int. Soccer	£9.95
9	Solo Flight	£14.95
10	Encounter	£8.95

TOP TEN OVER £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
1	1	IBM PC	£2,390	IBM
2	2	Apricot	£1,760	ACT
3	5	Televideo TS1603	£2,640	TH
4	3	Compaq	£1,960	Compaq
5	4	Apple III	£2,755	Apple
6	7	Sirius	£2,525	ACT
7	6	Wang Professional	£3,076	Wang
8	—	HP 85	£1,917	HP
9	10	NCR Decision Mate V	£1,984	NCR
10	8	Kaypro	£1,604	Kaypro

TOP TEN UP TO £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
1	1	Spectrum	£99	Sinclair
2	2	Commodore 64	£199	CBM
3	5	Electron	£199	Acorn
4	7	Amstrad	£349	Amstrad
5	3	BBC B	£399	Acorn
6	4	Vic 20	£140	CBM
7	—	Amstrad	£299	Amstrad
8	9	Atari 800XL	£199	Atari
9	6	Memotech	£199	Memotech
10	8	Oric	£99	Oric

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **September 20**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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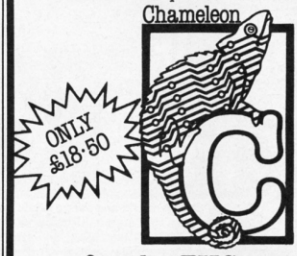

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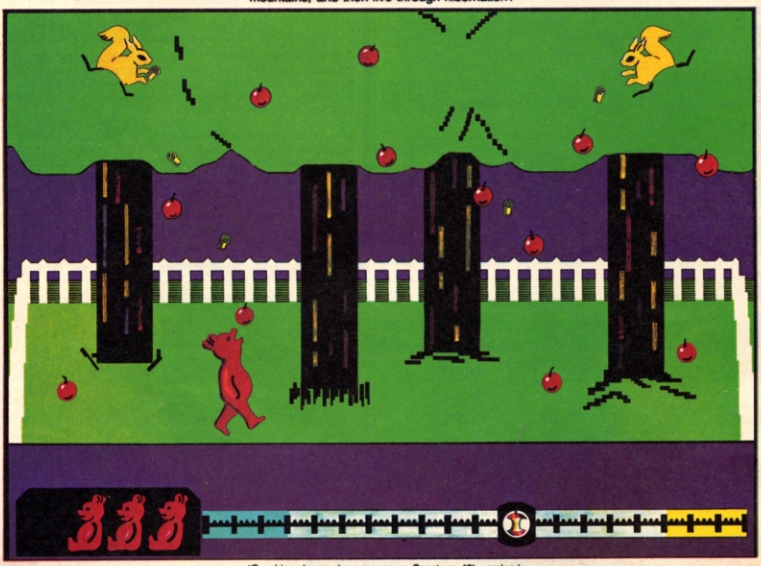

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RANDOM ACCESS

If something we've said has outraged, amused or impressed you, this is your chance to answer back. To celebrate the new-look *PCN* we decided to give our 'star' contributors a pay rise — the best letter of the week will now earn you £15. So send in your contributions to: Random Access, *Personal Computer News*, Evelyn House, 62 Oxford Street, London W1A 2HG.

Structured progs start with design

I was very disappointed to see the letters published in recent issues attacking the idea of structured programming and procedures. While an amateur programmer must always be free to accept or reject any method of programming, he should at least understand what he is rejecting if he is to do it publicly.

The first correspondent, in advocating the use of the GOTO statement said: 'I find the delights of structured programming not particularly useful.' I would suggest that Mr Craddock (*PCN* 75) does not understand the purpose of structured programming if he does not find it useful. It must not be forgotten that structured programming starts at the design stage, not at the Basic coding stage.

Mr Craddock says that he does not consider his creations to be good but he does like them to work. Obviously if a program does not work it cannot be good but there are other criteria for quality. If a program has a value to its users it will almost certainly need to be changed to meet their changing requirements. If the structure is correct amendment will be easy without the need to search the program to find out which part does what. In addition if the structure is right we should be able to take program fragments from other programs and so save ourselves a great deal of effort.

Mr Ward (*PCN* 76) attacks the use of PROC, saying that it is only a fancy way of saying GOSUB. In one sense he is right, but the fanciness conceals many advantages. PROC is usually faster because the interpreter does not have to search for the line number every time.

By using <LOCAL> variables it is possible to write the PROC without knowing what variables are being used in the main program, and so a ready written procedure may be kept for use in many programs.

David H Wild,
Hemel Hempstead, Herts

I am against piracy — OK?

After reading C Matthews' accusation (*PCN* 78) of me advocating tape copying, I quickly pulled out *PCN* 76 and re-read my original letter. I could find no part of the letter in which I said that it was all right to illegally copy tapes and so I must assume that one of two things happened.

Either C Matthews completely misunderstood me or, after seeing Merseyside in my address, and having seen a few too many episodes of *Brookside*, wrongly believes that everybody up here is on the take.

I am proud to say that I have never stolen anything in my life and I was hurt and angry to read such an accusation. I apologise if my letter appeared to do this but I was simply trying to suggest reasons why piracy occurs.

By the way, C Matthews, my contact hit-man should be on your doorstep within the next couple of days!

K Hewson,
Maghull, Merseyside

My QL word processor is a hit

Poor Sir Clive! The computer press have given him nothing but stick since he brought out the QL. Yes, of course he over-sold it; yes, of course he should have got it right before he sent it out. But now it lives up to nearly all of his original claims.

As a spare-time freelance writer, I write and sell articles and text-books. I had long dreamed of having a word processor — but my earnings from writing could nowhere near justify the expense. I was told that it would cost me around £1,500.

Innocently, I read the Sinclair brochure. It promised that the QL would do all that I needed. I bought the odd copy of PCN and pored over the ads for printers and monitors. I knew I'd need one of each. I ordered a QL in February — and bought a monochrome monitor (a Philips TP 200 for £80) and a daisy-wheel printer (a Smith-Corona TP-1 for £220). And then I waited.

The QL arrived at the end of June. By the end of July I had succeeded in connecting up the three pieces of equipment; I had been lucky. Two weeks later the QL gave up the ghost.

I sent my QL back to Sir Clive and received a new one within ten days. Since then all has been well. My fully-working word processor is capable of meeting all my semi-professional requirements: and it cost me only £750, the lot — including all the connecting cables, and even a table.

Gordon Wells,
Henfield, West Sussex

Consequences of love-hate league

There seems to be a growing anti-Sinclair league in this country. We all know the reasons for this somewhat passionate love-hate relationship, but do we all understand its consequences?

The home computer business seems to be currently going through a period of uncertainty and many companies are going into liquidation or falling into hard times. This is because the larger, more competitive, companies can make their presences felt by manipulating the market in their own ways.

We should all be aware of the inevitable invasion of Japanese businessmen clutching their MSX machines attempting to fill the shelves of our computer shops with a set of machines which represent no great quantum leap forward in technical innovation but, in the opinion of many, quite the reverse.

The idea of standardising computer systems has been in the minds of many for years. It's no bad thing when the finished standard is a machine which is technologically innovative and of a high degree of achievement. But when the cloning of an out-dated, 'nothing special' machine is in the air we should all beware.

What the British home computer market needs is innovation and technological advance. The standardisation of an out-dated system will be detrimental to the market and, more to the point, will take away sales from the experimenting and advancing computer manufacturers.

Sinclair Research is, of course, one of these advancing companies. They have provided us with various innovatory products which a few years ago would have been unheard of.

Nigel Shore,
Billingshurst, West Sussex

Quantum leap from Sinclair

I have seen the Quantum, and it leaps! Perhaps I've just been lucky with the Sinclair QL I've got, but it has worked very well for me.

I have found bugs, of course. For instance IF . . . ELSE statements are not accepted if you try to put them on a single line. Also a BEEP with less than 0.5 duration will go on for ever. Only the reset button will stop it — though one can save any current program.

Still, I like the Super Basic. One can do routines like this

```
100  PAPER 7 : CLS
200  REPEAT DO-IT
300  PAN RND (3 TO 15)
400  SCROLL RND (2 TO 8)
500  RECOL 5,6,7,0,1,2,3,4
600  END REPEAT DO-IT
```

This model of simplicity produces quite a respectable moving pattern on the screen.

Despite its bad start, I fully hope the QL to have a great future: outselling everything in its price-range.

M Williams,
Manor House,
London N16

Picture shudder on shuttle prog

I have just typed your published program 'Shuttle' (*PCN* 70) into my BBC Model B computer. When I completed it and typed RUN, alas, all I got was a picture shudder and nothing else.

I have checked the listing through my printer and it is correct. Can you tell if there is a bug or a typographical error in this program?

Can you help, as it is just too good a program to wipe from my disk collection.

Alex Elder,
Glasgow, Scotland.

I'm afraid you've got us stumped here. We aren't aware of any bugs or misprints in the program, and you're the only one who's complained. Maybe if you gave us a more detailed explanation of your problem we could help further. — Ed.

ROUTINE ENQUIRIES

Here's an end to the hair-tearing nail-biting keyboard-pounding frustration of programming your computer. Whatever your problem call on *PCN*'s panel of experts and we'll come up with an answer. Remember we cannot reply personally, so no stamped addressed envelopes please. Address your problems to *Routine Enquiries, PCN*, Evelyn House, 62 Oxford Street, London W1A 2HG.

Tandy MC10 owner on the upgrade

Q I recently bought a Tandy MC10 4K colour computer. Unfortunately this model is now redundant and there is very little information to be had and very little software. I knew this when I bought it but thought that by using PEEK and POKE I might learn something about machine code.

I now realise that without the support of books and magazines there is not much chance of my making any progress. Is it possible to upgrade the machine to 20K RAM, and if so would I then be able to use Tandy TRS-80 programs on the upgraded machine?

Also, has a book been published giving a comparison of the different types of Basic, and finally is there any way of connecting a Sinclair printer to the machine?
E Sanders,
Leamington Spa, Warks

A It is possible to upgrade your machine to a 20K model with a 16K upgrade costing £39.95 (cataglogue no. 26-3013). However, you will find that only a very small percentage of the TRS-80 program will be compatible with this upgraded model.

It is not possible to connect a Sinclair printer but Tandy do say there are a large selection of printers available for the Tandy MC10.

Your best bet for a comparison of the different Basics is the *PCW* conversion chart which was free with the magazine in September.

Homegrown BBC space invaders

Q I am having a bash at trying to write a space invader type game on my Beeb — but I've got a problem. I want to use the Return and Shift keys for functions such as 'fire' and 'thrust' but don't know what to do. Can you help?
Tom Cookson,
Romford, Essex

A By using the BBC's INKEY function you'll be able to read single keys. But normally the number you specify in brackets governs the time the function waits for a key to be pressed. This will read the return key but not the shift key.

There's also another problem — the BBC's auto-repeat function may hold the INKEY up so that the whole game goes very slowly.

To overcome this, set a very fast auto-repeat rate *FX 12,1. But remember to turn it off with *FX 12,0 and *FX 15,0 before your program ends. As an alternative you can give a negative number with INKEY; it tests that a particular key is held down at the moment when INKEY is called. INKEY (−1) is −1 if shift is held down and 0 if it isn't. INKEY (−74) checks the return key.

You can test all of the keys this way. If you want further information take a look at page 273 onwards of the user guide.

TV whimpers when Vic 20 blacks it out

Q Is there any reason why my television screen would whimper when I POKE it black on my Vic 20? I'd think perhaps it's the machine except that it only happens with black.
F Barrowclough,
Tinsley, Sheffield

A Rest assured that it's no fault of the Vic 20's that your television objects to you blacking its eye. The explanation lies in the way that TVs work — you might call it temporary interference, with normal service to be resumed shortly.

The colour guns that sweep to and fro to give you a display are always switched on and charged up. Black is almost alien to them; to get black they are suppressed, and the change in the signal generates a good deal of magnetic inductance. This is where the noise you've heard comes from.

Fool your Spectrum with BIN command

Q I have been programming on a Spectrum for a few months but still haven't found a better way of defining graphics than with DATA and BIN statements. When there's a lot of graphics it's quite a chore.

Listings I've seen in books and magazines use another method, with DATA statements and numbers separated by commas. I'd like to use it but I don't understand what's happening and am nervous about trying to use something I don't follow.
Brian Bannister,
Southampton, Hants

A No need to be nervous. It's simply a matter of letting the Spectrum know who's boss. You have to bamboozle it into thinking it's dealing with binary numbers. This way you can build up your own confidence by revealing how witless the Spectrum actually is.

When you define a character, create a series of eight apparently binary numbers by giving shaded squares a 1 and empty ones a 0. You POKE them in using the BIN function, persuading the Spectrum that the numbers are binary.

But what you've seen elsewhere takes the method a stage further. In this, you convert each binary series into base ten equivalents and POKE them instead.

As you do this it will probably occur to you that what you're doing is precisely the kind of number crunching that computers are supposed to be good at. It should be possible for you to write a routine that will let you design characters on an enlarged grid and let the Spectrum work out the relevant base ten numbers. Not simple, but possible. And in the process you'll probably discover other possibilities that will add to your range at the same time.

Commodore SX64 needs assistance

Q I need to produce simple diagrams on a page of text using a Commodore SX64 (bought especially for this purpose), Easyscript and a Shinwa CP80 printer.

I do not know whether a light pen or digitiser is the answer for this simple and useful operation.
W H Lovelock,
Bangor, Gwynedd.

A While there's no doubt that it is a useful operation, simple it isn't — not using computers anyway. That's why Apple's Lisa and Macintosh created such a stir. That kind of integration is extremely rare on home computers.

The best bet using your present set-up would be a product like *Flexidraw* (see next week's issue for a full review). It's a light pen-based graphics package which allows you to mix text on your designs. Off hand, we can't think of many alternatives (*ie* none at all). For straightforward graphics work you're almost spoilt for choice — but Koalapad from Audiogenic stands out from the crowd.

Easyscript isn't really going to be of any help for the application you describe although it's a very workable word processor.

ZX81 heading for a pools win

Q How can I get my ZX81 to produce random numbers without repeating any particular number. Or rather, is there any way I can do it without taking up megabytes?
John Tracey,
Hull

A Random number purists will be shocked and horrified by what you propose, but if you're using them for, say, a pools coupon, it's a perfectly legitimate exercise. Fortunately there's a common solution with a minimal appetite:

```
10 RAND
20 LET N=35
30 DIM A(N)
40 FOR I=1 TO N
50 LET A(I)=I
60 NEXT I
70 LET C=N
80 LET X=INT(RND*C+1)
90 PRINT A(X)
100 LET A(X)=A(C)
110 LET C=C-1
120 IF C<>0 THEN GOTO 80
```

This gets you as high as 35 without repeats. You should be able to force it a little higher with some more work, or if you need more you could change the limits and run it again — once you start fiddling with random numbers you can afford to throw scruples out of the window.

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Dumping to memory for Amstrad fans

Here is a very short but useful routine which would be of interest for Amstrad CPC 464 owners.

When writing a program using one screen which was quite complicated, I came up with this routine which allows instant dumping of the screen to memory and virtually instantaneous retrieval at a later stage.

It takes only 24 bytes of machine code and a few lines of Basic.

It stems from the facility which allows you to save the screen on tape:

SAVE "filename." B. &C000,&4000

The machine code routine is as follows:

```
DUMP:      LD BC,&4000
           LD HL,&C000
           LD DE,&6B7A
           LDIR
           RET
RETRIEVE:  LD BC,&4000
           LD HL,&6B7A
           LD DE,&C000
           LDIR
           RET
```

The similarity between the cassette SAVE shown above and the machine code can be seen. BC is a counter set to the number of points on the screen, *ie* 16384 (&4000).

For the DUMP, HL is the first point of the screen (&C000) and DE is the starting location of the area where the screen will be stored (&6B7A) which is 16K below the top of the Basic memory.

The command LDIR loads the contents of the location pointed to by HL into the location pointed to by DE. This is automatically repeated 16384 (&4000) times.

The process is simply reversed for retrieval of the screen.

The Basic loader for the routine is as follows:

Line 10 reserves the top 16K of memory for the saved screen and the machine code routine so that they cannot be overwritten by a Basic program.

CALL &6B60 or CALL 27500 will now copy the screen to memory and CALL &6B6C or CALL 27500 will retrieve it.

Retrieval is instantaneous but as with the cassette comand you should set all PEN and INK colours to the values they held when the screen was stored as this is not taken into account if they are changed. The example we used, the picture shifted to the left when it reappeared on the screen.

T J Allen
Brighton,
Sussex

```
10 MEMORY &6B5F

20 FOR N=&6B60 TO &6B77

30 READ X

40 POKE N,X

50 NEXT N

60 DATA 1,0,64,33.0,192,17,122,107,237,176,201

70 DATA 1,0,64,33.122,107,17,0,192,237,176,201
```

The state of play with Orics

Some Oric-1 and Atmos owners may not realise the full potential of the PLAY command when its non-detection of "ILLEGAL QUANTITY ERROR'S allows them to use parameters out of the valid ranges.

PLAY can be used to generate continuous and complex sound effects without the prior use of SOUND or MUSIC and without unduly slowing down your program.

The following are some examples of the effects that can be produced:

```
Waves      PLAY 40.40.60,4000
or         PLAY 30.40.20,9000
Buzzer     PLAY 48.90.100,60
Train      PLAY 200.100,100,200
Plane      PLAY 200.100,100,20
Alert      PLAY 17.80.100,200
Rotor      PLAY 58.80.100,60
Jet        PLAY 12.91.555,3
```

K Heptinstall,
Blackpool, Lancs

Printing letters on the Oric screen

This routine, which works on both Oric computers, prints a string of letters on the high resolution screen. The letters can vary from being twice the size to six time the normal size, in any combination of horizontal or vertical dimensions.

The first subroutine (9000-9020) quite simply redefines the character "@" — CHS$(96), to the size of the pixel required for the size of lettering. SX is the horizontal size of the pixel (2-6), SY the vertical size (1.8), X the horizontal position of the cursor (0-239), Y the vertical position of the cursor (0-199) and W$ the word to be printed.

J Wooster,
High Wycombe, Bucks.

```
10 DATA 6,1,20,90.FLAT,2,8,20,20,TALL,2,2,100,60,
   SMALL,2,1
12 DATA 20,110,SMALLER,6,8,20,128,BIG,3,3,100,20,
   MEDIUM
14 HIRES:REPEAT:READSX,SY,X,Y,W$:GOSUB 9000: GOSUB
   9030
16 UNTIL W$="MEDIUM":END
17:
18:
19:
9000 Z=64-2^(6-SX):Z(1)=32:Z(2)=16:Z(3)=8:Z(4)=4:
     Z(5)=2:Z(6)=1
9010 B=0:WDT=6*SX:ST=8*SY:FOR A=39680 TO 39687:
     B=B+1:IF B>SY THEN Z=0
9020 POKE A,Z:NEXT A:RETURN
9030 POKE 775,255:FOR LOOP =1 TO LEN(W$):
     B=ASC(MID$(W$,LOOP,1)):IF B=32 THEN 9070
9040 S=38912+(B*B):CURSET X,Y,0:FOR A1=0 TO 7:
     A=PEEK(S+A1):FOR A2=1 TO 6
9050 IF Z(A2) AND A THEN CHAR 96,0,1
9060 CURMOVSX,0.0: NEXT A2:Y=Y+SY:CURSET X,Y,0:NEXT
     A1:Y=Y-ST
9070 X=X+WDT:A=FRE(""):NEXTLOOP : POKE 775,39:RETURN
```

Sound advice on the Amstrad

Here are a few tips I've come across for the Amstrad CPC 464.

○ The play button is disabled when you are neither loading or saving a program from cassette. The command OUT 512,16 will enable the cassette unit and OUT 512,0 will disable it again. These commands could be useful if you wished to have a sound track accompanying your program.

○ Horizontal scrolling can be achieved with OUT 256,I where I is the character position relative to the left of the screen. The text is not lost since it wraps round to the right hand side of the screen. In mode 1, shifts occur by one whole character position while in mode 2 shifts are by 2 characters; mode 0 produces a shift of half a character. As it is a hardware scroll, it is very fast.

○ Try this command for sound effect:

```
10 ENT -1,5,5,1,10.-5,1,5,1,1
20 SOUND 1,500,10000,7,0,1
```

T Harkness,
Voorschoten, Holland

Atmos editing can zz along

If you find editing on your Atmos with the control A key infuriatingly slow here is a way of speeding the process.

The number stored in location #24E gives a delay between the initial single response to the keypress and the auto-repeat on that key, while the number stored on location #24F gives the repeat rate once the key starts autorepeating.

Multiplying these numbers by 30 will give you the time in milliseconds. Therefore, reducing both these figures by equivalent POKES you will be able to make the keyboard work at a speed that suits you.

I have found setting the first location to 8 and the second to 1 very useful for editing applications.

You can obtain these settings by typing DOKE#24E#0108.

A J Newham,
Northam, Southampton

READOUT

'Filing Systems and Databases for the BBC Micro' by AP and DJ Stephenson, published by Granada Publishing, at £7.95 (paper back, 219 pages).

Some snappy titles mark out their books as instant winners, and you wonder how long it will be before a TV studio buys the serialisation rights. This is plainly not one of them.

But it turns out to be far from a dour tome. The lively introduction will open your eyes about home filing systems in the pre-micro era, and carefully explains media, structures, ways and means. To check that you've got the message, each chapter closes with a summary and self-test section, including some questions of remarkable obscurity such as what is the connection between Kansas City and the cassette recorder?

The book does not explore commercially-available software for the BBC — although one or two packages could do with some independently-produced documentation. Messrs Stephenson and Stephenson aim to supply the means for you to develop your own, covering so much ground that potential users might be discouraged but that is an unavoidable risk.

They devote much time and space to Kansas City's greatest export, the cassette recorder. You're well over half-way through the book before it states clearly: 'Disks are the only practical storage medium for serial, sequential and indexed data files.' That seems to leave only nail files as suitable for cassette storage.

The book's index is economical but sparse. This is a quibble and should not be allowed to detract from an eminently useful book. **DG**

'A Beginner's Guide to the Acorn Electron by Richard and David Graves, published by Kingfisher, at £2.50 (paperback, 72 pages).

The Graves family is at it again. Using their fun style, Richard and his eleven-year-old son gently ease you into nine chapters of getting to grips with your Electron. You are taken on a tour of your machine, then you're shown how the computer can work for you in terms of its capabilities.

Colourful illustrations of a robot-type figure emphasise particular points in the chapters, and diagrams highlight and add to the information in the text.

You'll be able to work out some simple sums, draw and make sounds on your computer. And you'll be able to get a crack at tapping some simple programs and seeing how they work.

In addition you learn how to save and load programs and the book lists programming words.

This book is obviously limited to what it can cover. But for £2.50 you can't go wrong for just a simple, plain English introduction to learning the basics on your Electron. **SG**

'Step-by-Step Programming — Acorn Electron' by Ian Graham, published by Dorling Kindersley, at £5.95 (paperback, 64 pages).

This book is the first of a series of guides to get you finger - tapping on your Electron. It plans to offer the basic principles of programming and progresses to an advanced level in the books that follow.

However at £5.95, this lavishly-produced paperback, with illustrations, diagrams and photographs, is a bit overpriced if you want to get your money's worth in terms of value. And in its magazine-size appearance the author delves into the Electron in a sketchy manner, covering as much as he can in few pages.

As with all these getting-to-know - your - computer books we take a look inside the machine and look at its keyboard. Then we go on to setting up the equipment and by page 14 we get down to actually using the machine.

Other topics covered include the use of graphics, colours, writing programs and some general hints and tips. I suppose to the raw beginner, hunting for material on his machine, this looks an attractive book to start with.

It is written in a somewhat clear informative style which makes it easy to understand and follow for any newcomer to computers.

But before you dip into your piggy bank for this book, I would shop around. I'm sure there's much more biting material about, because after you've read this book it'll probably gather dust on your shelves. **SG**

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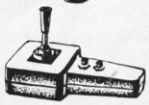

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COMCON

TUMBLING DICE

Definitely one up from the local 'Crap' game, this version of Yahtzee by Ron Roberts requires a good deal of thought as well as luck. So get rolling . . .

Yahtzee is a popular dice game, normally played with scoring cards, a shaker and five dice. This version allows you to challenge your Commodore 64 to a pretty tricky game.

Up to four people can play, and if you want the computer to play, you should make sure the first five letters are CHIPS when you're prompted for a name.

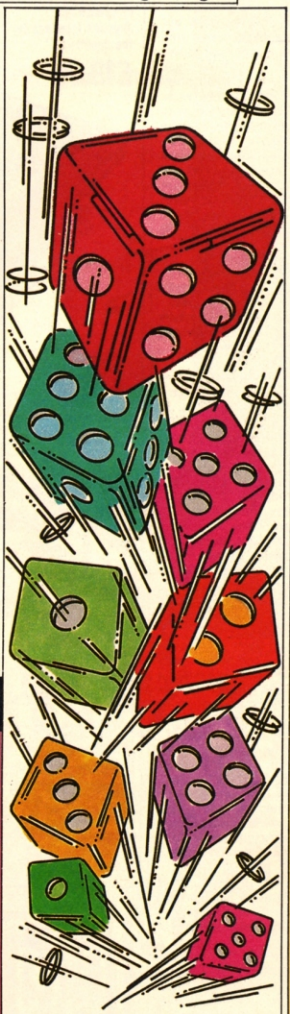
Each player has an initial five dice which are chosen by a random function. You roll by hitting the space bar, and from these five dice you must try to fill thirteen different categories. These include three of a kind, four of a kind, small straight, long straight, full house and so on. You can only fill a category once and must score every time, so you have to be careful or you might find yourself scoring nothing for a potentially high scoring category. It is possible to re-roll as many of your dice as you want two more times, in order to get the right combination, by pressing R followed by the dice number.

The dice are brightly coloured, and make a rolling noise each time they are thrown. They are displayed alongside the scoreboard, which is set out so that you can see which combinations you still need to make. You score by pressing S followed by the category number.

The computer, or should I say Chips, does occasionally seem to make some rather strange decisions, but since it often wins, you could maybe pick up some useful tips and become an expert Yahtzee player.

The character codes in brackets should be entered as follows:

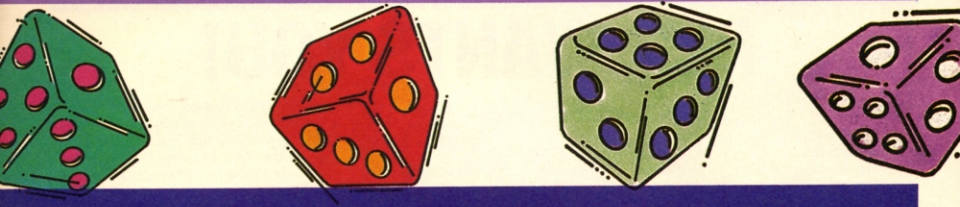
<166> — press the Commodore logo and + together.
<209>—press shift and Q together.
<C=7> — press the Commodore logo and 7 together.
<175> — press the Commodore logo and P together.
<183> — press the Commodore logo and Y together.
<207>—press shift and O together.
<208>—press shift and P together.
<180> — press the Commodore logo and H together.
<185> — press the Commodore logo and O together.
<165> — press the Commodore logo and G together.
<170>—press shift and Y together.
<204>—press shift and L together.



PROGRAM NOTES

1-15	Read in data which carries out a PRINT AT routine.
30	Sets background and border colour
32-37	Introduction page, prints dice and subroutines for the sound of the rolling dice.
38-45	Do you want instructions? Sets time to 0.

```
 1 REM YAHTZEE(RON ROBERTS 1983)
 2 IP=49264
 3 READA:IFA=-1THEN30
 4 POKE(P,A:)P=(P+1
 5 GOTO3
 6 DATA32,241,183,134,87,32,241
 7 DATA183,134,88,224,48,176,6
 8 DATA165,87,201,26,144,3,76
 10 DATA72,170,32,182,229,165,87
 11 DATA240,9,169,17,32,22,231
 12 DATA198,87,208,247,165,88,240
 13 DATA9,169,29,32,22,231,198,88
 14 DATA208,247,32,253,174,76,168,170,-1
 15 DATA17,37,19,63,21,154,22,227,25,177,
 28,214,32,84,34,175,-1-1
 30 POKE53280,11:POKE53281,11
 32 PRINT"(CLR)(PUR)(166)(166)(166)(166)(
 166)(166)(166)(166)(166)(166)(166)(166)(

 166)(166)(166)(166)(166)(166)(166)(166)(
 166)(166)(166)(166)(166)(166)(166)(166)(

 166)(166)(166)(166)(166)(166)(166)(166)(
 166)(166)(166)(166)"
 33 PRINT"(DWN)(DWN)(DWN)      (C=7)(209)(2
 09)(209)(209)(209)(209)(209)(209)      (YEL)Y

 AHTZEE(C=7)      (209)(209)(209)(209)(20
 9)(209)(209)"
 34 PRINT"(DWN)(C=3)                (RON ROBE
 RTS 1984)
 35 PRINT"(DWN)(DWN)(DWN)(PUR)(166)(166)(
 166)(166)(166)(166)(166)(166)(166)(166)(

 166)(166)(166)(166)(166)(166)(166)(166)(
 166)(166)(166)(166)(166)(166)(166)(166)(

 166)(166)(166)(166)(166)(166)(166)(166)(
 166)(166)(166)(166)(166)(166)"
 36 FORA=1TO5:GOSUB2000:PRINT"(RON)(C=8)(
 RHT)(RHT)(RHT)(RHT)(209)(209)(DWN)(LFT)

 (LFT)(LFT)(209)(209)(DWN)(LFT)(LFT)(LFT
 )(209)(209)";:PRINT"(UP)(UP)(UP)(RHT

 )";
 37 FORT=1 TO 250:NEXTT:NEXTA
 38 TI$="000000"
 40 SYS49284,20,5,"(RON)(WHT)DO YOU WANT
 INSTRUCTIONS(Y/N)"
 42 GETK$:IFK$="Y"THENGOSUB876:GOTO46
 43 IFK$="N"THEN46
 44 IFTI$="000010"THENTI$="000000":GOTO46

 45 IFK$<>"Y" OR K$<>"N"THEN42
 46 PRINTCHR$(14)
 48 PRINT"(CLR)(DWN)(RON)(C=5)NUMBER OF P
 LAYERS(UP TO 4)(WHT)";
 49 GETS$:IFTI$="000005"THENNP=2:K=9:GOTO
 55
 50 IFS$=""THENGOTO49
 51 IFK(9THENNP=VAL(S$):PRINTNP
 54 IFNP(1ORNP)4THEN48
 55 DIMN$(NP),F$(NP),S(NP),ROLL$(3),SC(NP
 ,13),PO(13),U(NP,13)
 56 DIM FH(6),D(5),GT(NP,6),BO(NP),OT(NP)
 ,D2(5)
 57 IFK=9THENN$(1)="CHIPS 1":N$(2)="CHIPS
  2":GOTO62
 58 FORA=1TONP
 59 PRINT:INPUT"(DWN)(PUR)PLAYER'S NAME (
 WHT)";N$(A)
 60 NEXTA
 61 PRINTCHR$(142)
```



48-54 How many players (1-4)? After five seconds will go straight into a demonstration game.
55-56 Dimension arrays.
57 Demonstration game so both players are called Chips.
58-60 Input players' names for normal game — if you want to play the computer, you must input a name in which the first five letters are CHIPS.
61-84 Hit the space bar to roll the dice to determine the player's order.
86-100 Produces five random dice and goes to the relevant subroutine for that number.
102 Goes on to next player.
106-114 Sorts out the highest score.
116-132 Prints the order of the players.

```
62 REM IF ONLY ONE PLAYER JUMP DICE ROLL

64 IF NP=1THEN136
66 PRINT"{CLR}WE WILL NOW ROLL DICE TO C
HOOSE"
68 PRINT"{DWN}PLAYER'S ORDER"
70 FORT=1 TO 1700:NEXT
72 FORN=1TONP
74 PRINT"{CLR}";N$(A);"'S TURN"
76 FORT=1 TO 1400:NEXT
78 IFLEFT$(N$(A),5)="CHIPS"THEN88
80 SYS49264,20,1,"{RON}{PUR}HIT SPACE BA
R TO ROLL DICE{ROF}"
82 GETA#:IFA#<>" "THEN82
84 IFA#<>" "THEN82
86 BEGIN=RND(-TI):REM GEN R.N.D'S
88 FORB=1TO5
90 R=INT(5*RND(1)+1.5)
92 SUM=SUM+R
94 ONRGOSUB828,836,844,852,860,868
96 FORT=1TO200:NEXT:NEXTB
98 SYS49264,0,10,SUM:FORT=1 TO2000:NEXT
100 S(A)=SUM
102 SUM=0:NEXTA
104 FORA=1TONP-1
106 IFS(A+1)=<S(A)THEN112
108 TE=S(A):TE$=N$(A):S(A)=S(A+1):N$(A)=
N$(A+1)
110 S(A+1)=TE:N$(A+1)=TE$:SW=1
112 NEXTA
114 IFSW=1THENSW=0:GOTO104
116 FORT=1TO1300:NEXT:PRINT"{CLR}       O
RDER OF PLAY
118 PRINT"                {175}{175}{175}{175}{175
}{175}{175}{175}{175}{175}{175}{175}{175}{175}{175}
}"
120 FORA=1TONP
122 PRINT"{DWN}";A;".";"{RHT}";N$(A);S(A
)
124 NEXTA
126 TI$="000000"
128 REM
130 IFTI$="000006"THEN134
132 GOTO128
134 REM SCOREBOARD
136 FORGA=1TO6
137 PRINT"{CLR}"
138 GOSUB 8000
139 PRINT"{HOM}PLAYERS    ";
140 C=13
142 FORA=1TONP:PRINTTAB(C);A;:C=C+5:NEXT
A:PRINT
144 PRINT"{PUR}{20?}{183}{183}{183}{183}
{183}{183}{183}{183}{183}{183}{183}{183}{183}{183}

{183}{183}{183}{183}{183}{183}{183}{183}{183}{183}
{183}{183}{183}{183}{183}{183}{183}{183}{183}{183}

{183}{183}{183}{183}{20?}{183}{20B}"
146 PRINT"{PUR}{180}{GRN} 1 ACES
                {PUR}  {165} {170}
148 PRINT"{PUR}{180}{GRN} 2 TWOS
                {PUR}  {165} {170}
150 PRINT"{PUR}{180}{GRN} 3 THREES
                {PUR}  {165} {170}
152 PRINT"{PUR}{180}{GRN} 4 FOURS
                {PUR}  {165} {170}
154 PRINT"{PUR}{180}{GRN} 5 FIVES
                {PUR}  {165}2{170}
156 PRINT"{PUR}{180}{GRN} 6 SIXES
                {PUR}  {165} {170}
158 PRINT"{PUR}{180}{GHT}   BONUS
                {PUR}  {165} {170}

160 PRINT"{PUR}{180} UPPER TOTAL
                {PUR}  {165} {170}
162 PRINT"{PUR}{180}{C=6} 7 3/KIND
                {PUR}  {165}3{170}
164 PRINT"{PUR}{180}{C=6} 8 4/KIND
                {PUR}  {165} {170}
166 PRINT"{PUR}{180}{C=6} 9 FL.HOUSE
                {PUR}  {165} {170}
168 PRINT"{PUR}{180}{C=6}10 SM.STRT
                {PUR}  {165} {170}
170 PRINT"{PUR}{180}{C=6}11 LG.STRT
                {PUR}  {165}4{170}
172 PRINT"{PUR}{180}{YEL}12 YARTZEE
                {PUR}  {165} {170}
174 PRINT"{PUR}{180}{C=3}13 CHANCE
                {PUR}  {165} {170}
176 PRINT"{PUR}{180}{C=7}LOWER TOTAL
                {PUR}  {165} {170}
178 PRINT"{PUR}{180}{GHT}GRAND TOTAL
                {PUR}  {165}5{170}
180 PRINT"{204}{175}{175}{175}{175}{175}
{175}{175}{175}{175}{175}{175}{175}{175}{175}{175}

{175}{175}{175}{175}{175}{175}{175}{175}{175}
{175}{175}{175}{175}{175}{175}{175}{175}{175}{175}

{175}{175}{175}{175}{204}{175}{186}{BLK}{C=7}
"
182 FOR NT=1TO13
184 FORA=1TONP
186 FORNS=1TO4
187 PRINT"{C=7}";
188 SYS49264,20,0,N$(A);"{C=7}'S";" TURN
                "
190 IFLEFT$(N$(A),5)="CHIPS"THENN5=1
192 IFN5=1THENSYS49264,21,0,"

194 N5=0
196 IFLEFT$(N$(A),5)="CHIPS"THENGOSUB504
:GOTO240
198 IFNG>1THENSYS49264,21,0,"{C=6}HIT R
TO ROLL DICE S TO SCORE
199 IFNG>1THENINPUT"{RHT}";ROLL$
200 IFNG>1THENU2=ASC(ROLL$)
201 IFNG>1ANDU2{82ORU2>83THENSYS49264,20
,0,"                ":GOTO198
202 IFNG>1ANDLEN(ROLL$)<2THENPRINT"{ UP}
{ UP}":GOTO199
203 IFLEFT$(ROLL$,1)="S"THEN208
204 FORU=2TOLEN(ROLL$)
205 J1=VAL(MID$(ROLL$,U,1)):IFNG>1ANDJ1<
1ORJ1>5THENPRINT"{ UP}{ UP}":GOTO199
206 NEXTU
207 IFLEFT$(ROLL$,1)="R"THEN211
208 FORU=2TOLEN(ROLL$):IFNG>1THENT$=MID$
(ROLL$,2,LEN(ROLL$)-1):J1=VAL(T$)
209 IFNG>1ANDJ1{1ORJ1>3THENPRINT"{ UP}{
UP}":GOTO199
210 NEXTU
211 IFNG=4ANDLEFT$(ROLL$,1)="R"THENINPUT
"{ UP}{YEL}YOU MUST SCORE NOW    ";ROLL$

212 IFNG>1THENSYS49264,22,0,"

213 IFNG>1THENGOSUB304
214 IFD$="S"ORPK=1THEND$="":GOTO240
215 IFNG=1THENSYS49264,21,0,"{YEL}HIT SP
ACE BAR TO ROLL DICE
216 SYS49264,23,11,"{YEL}TURN ";NT;" THR
OW ";NG
218 IFNG=1THENGETK$
220 IFNG=1ANDK$<>" "THEN220
222 IFNG=1THEN216
224 REM ROLL DICE ON 1ST GO

226 IFNG>1THEN240
228 FORB=1 TO 5
230 R=INT(5*RND(1)+1.5)
232 D(B)=R
234 ONRGOSUB828,836,844,852,860,868
236 FORT=1TO200:NEXTT
238 NEXTB
240 IFLEFT$(N$(A),5)="CHIPS"THENGOSUB810

242 NEXTNG
244 FORT=1 TO 800:NEXT
246 FORB=1TO5:GOSUB820:NEXTB
248 NEXTA
250 NEXTNT
252 FORT=1 TO 1600:NEXT
254 REM PRINT GAME AND SERIES TOTALS
256 PRINT"{CLR}":PRINTCHR$(14)
258 PRINT"{PUR}                YARTZEE"
260 PRINT"{C=7}                {185}{185}{1
85}{185}{185}{185}{185}{BLK}"
262 PRINTSPC(10);"{DWN}{YEL}GAME TOTAL":
PRINTSPC(24);"{ UP}{YEL}SERIES TOTAL{DWN
}"
264 FORN=1TONP
266 OT(N)=OT(N)+GT(N,GA)
268 NEXTN
270 FORN=1TONP
272 PRINTN$(N);:PRINTTAB(11);GT(N,GA);
274 PRINTTAB(25);OT(N)
276 REM
278 PRINT:NEXTN
280 REM EMPTY OLD SCORES
282 FORDD=1TONP
284 FORBB=1TO13:SC(DD,BB)=0:U(DD,BB)=0:B
0(DD)=0
286 NEXTBB
288 NEXTDD
290 IFGA=6THENEND
292 IFGA<6THEN PRINT"{DWN}ANOTHER GAME{Y
/N}"
294 GETAG$:IFAG$=""THEN294
296 IFAG$="N"THEN302
298 IFAG$="Y"THENPRINTCHR$(142):GOTO138
300 IFAG$<>"Y"ORAG$<>"N"THEN294
302 END
304 REM ROLL DICE FOR GOES 2&3
306 LG=LEN(ROL$)
308 IFLEN(ROL$)>5THENLG=6
310 FORD=1TOLG
312 D#=MID$(ROL$,D,1)
314 IFD#="S"THENGOSUB332:RETURN
316 IFD>1THENB=VAL(D#):GOSUB820
318 NEXTD
320 FORD=2TOLG
322 D#=MID$(ROL$,D,1):B=VAL(D#)
324 R=INT(5*RND(1)+1.5)
326 D(B)=R
328 ONRGOSUB820,836,844,852,860,868
330 FORT=1TO200:NEXT:NEXTD:RETURN
332 REM SCORING ROUTINE 1-6 AND 13
334 FORC=1TO6
336 FORJ=1TO5
338 IFD(J)=CTHENFH(C)=FH(C)+1
340 IFC=1THENLE=LE+D(J)
342 NEXTJ
344 PO(C)=FH(C)*C
346 NEXTC
348 PO(13)=LE
350 REM 7 8 9 12
352 PO(9)=0:REM RESET
354 FORC=1TO6
356 IFFH(C))=3THENPO(7)=LE
```

15 ▶

How to write for Personal Computer News

PCN WANTS YOU!

Whatever you want *PCN* will try to bring you . . . but we need your help. You tell us you want more programs, more features to help you get the most from your machine. Well, we've listened and we're offering more programs, projects and useful information than any other magazine. But if your machine isn't featured you've only yourselves to blame.

So we're making you an offer you can't refuse. Send us your programs and in return we'll send you upwards of £80 for each one published. We also welcome written contributions — tell us about the ways that you've conquered your machine; your best sound routines, those great graphics features, how you mastered disk and printer.

What we want

We're looking for programs and articles on any aspect of using personal computers — including games, graphics, utilities, and applications.

If you're sending a written contribution we require it in typed form (dot matrix printout is fine), with double spacing on one side of the paper only. Where possible include short, example

programs to illustrate the article.

If you've written a program we require a working version, on tape for any machine, or on disk if you prefer for Commodore 64, Atari, BBC or Apple. We'd also like notes on how the program works, what it does, and any special features that you've included. A printed listing would be nice but isn't essential — on the other hand we can't consider listings without a working copy on tape or disk.

If you would prefer to make preliminary enquiries before submitting material, you should write — don't phone — to *Personal Computer News*, Evelyn House, 62 Oxford Street, London W1A 2HG. Questions about articles should be addressed to John Lettice, Features Editor; program queries should go to Nickie Robinson, Programs Editor.

If we decide not to use you contribution it will be returned to you if you enclose a stamped, self-addressed envelope but give us at least six weeks. You should receive payment four weeks after publication.

If you want to enclose photographs and screen shots, feel free to do so but make sure they are of good quality and make them colour transparencies or black and white prints. Do not send colour prints.

So, get cracking. Just think . . . two articles could pay for that printer, disk drive, or even a new machine.

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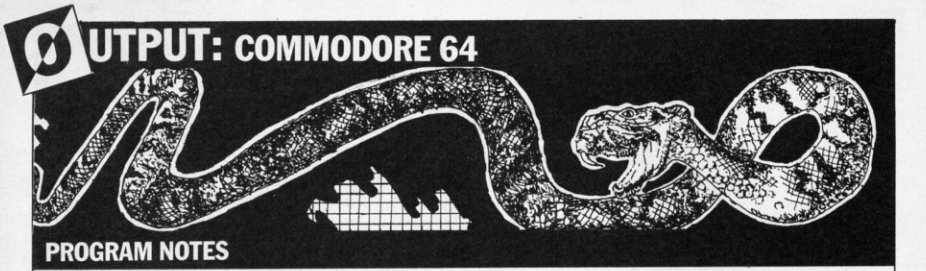

PROGRAM NOTES

◀13

134-180	Print scoreboard, positioning the players' score in columns
182-203	Check to see if it is the computer's turn, if not then input R and the numbers of the dice you want to re-roll as a string or S and the category you want to score in.
204-206	Check roll input.
207-210	Check score input.
224-238	Roll the first five dice.
240-248	GOSUB for the computer's go.
252-278	Game over, print game total and series total.
280-302	Empty old scores and ask if you want another game, if the series isn't complete.
304-330	Roll the chosen dice for a second time.
332-348	Scoring routine for 1-6 and 13.
350-378	Scoring routine for 7-12.
380-420	Scoring routine for long and short straights.
424-428	You have used up this category already.
430-448	Reset the variables.

```
358 IFFH(C))=3THENBG=1
360 IFFH(C)=2THENSM=1
362 IFFH(C))=4THENPO(8)=LE:PO(7)=LE
364 IFFH(C)=5THENPO(12)=58:PO(9)=25:T=1
366 NEXTC
368 IFPO(7)<LE THENPO(7)=0
370 IFPO(8)<LE THENPO(8)=0
372 IFY=1THENGOSUB610
374 IFY=0THENPO(12)=0
376 IFSM=1ANDBG=1THENPO(9)=25
378 IFSM<>1ANDBG<>1ANDT=0THENPO(9)=0
380 REM SMALL AND LONG STRAIGHT
382 FORJ=1TO4
384 IFD(J+1))>D(J)THEN390
386 TE=D(J):D(J)=D(J+1)
388 D(J+1)=TE:SW=1
390 NEXTJ
392 IFSW=1THENSW=0:GOTO382
394 REM LG.STR
396 FORJ=1TO4
398 IFD(J)+1=D(J+1)THENCOUNT=COUNT+1
400 NEXTJ
402 IFCOUNT=4THENPO(11)=40:PO(10)=30
404 IFCOUNT<4THENPO(11)=0
406 REM SM.STR
408 XI=SGN(FH(1))+X2=SGN(FH(2))+X3=SGN(F
H(3))+X4=SGN(FH(4))+X5=SGN(FH(5))
410 X6=SGN(FH(6))
412 IFXI=1ANDX2=1ANDX3=1ANDX4=1THENPO(10
)=30:RN=6:GOTO420
414 IFX2=1ANDX3=1ANDX4=1ANDX5=1THENPO(10
)=30:GOTO420
416 IFX3=1ANDX4=1ANDX5=1ANDX6=1THENPO(10
)=30:RN=1:GOTO420
418 PO(10)=0
420 IFLEFT$(N$(A),5)="CHIPS"THEN436
422 REM NOW FILL IN SCORES
424 B=VAL(MID$(ROLL$,2,2))
426 IFU(A,B)=1THENSYS49264,21,0,"CATEGOR
Y USED UP. CHOOSE AGAIN "
428 IFU(A,B)=1THENINPUT"<RHT>";ROLL$
430 SYS49264,22,0,"
                    "
432 B=VAL(MID$(ROLL$,2,2))
434 SC(A,B)=PO(B):U(A,B)=1
436 REM RESET VARIABLES
438 LE=0:T=0:SM=0:BG=0:COUNT=0:SB=0:GT=0
:S=0
440 IFA=1THENHP=16
442 IFA=2THENHP=21
444 IFA=3THENHP=26
446 IFA=4THENHP=31
448 IFLEFT$(N$(A),5)="CHIPS"THEN502
450 FORJ=1TOB:FH(J)=0:NEXTJ
452 X#=STR$(SC(A,B)):KL=B+1:JL=B+3
454 IFB)0ANDB<7THENSYS49264,KL,HP-LEN(X$
),VAL(X$)
456 FORU=1TO6:REM UPPER TOTAL
458 S=S+SC(A,U)
460 NEXTU
462 IFS)=63THENBO(A)=35
464 S=S+BO(A)
466 G#=STR$(S)
468 IFBO(A)=35THENJ$=STR$(BO(A))
470 IFBO(A)=35THENSYS49264,8,HP-2,"<RON
>"+MID$(J$,2,2);"<ROF>"
472 SYS49264,9,HP-LEN(G#),VAL(G#)
474 REM PRINT>13
476 IF B>6ANDB<14THENSYS49264,JL,HP-LEN(
X$),VAL(X$)
478 REM LOWER TOTAL
480 FORU=7TO13
482 LET SB=SB+SC(A,U)
484 NEXTU
486 B#=STR$(SB)
488 SYS49264,17,HP-LEN(B#),VAL(B#)
490 REM GRAND TOTAL
492 FORU=1TO13
494 GT=GT+SC(A,U)
496 NEXTU
498 GT=GT+BO(A):GT#=STR$(GT):GT(A,GA)=GT

500 SYS49264,18,HP-LEN(GT#),VAL(GT#)
502 RETURN
504 REM MACHINE'S TURN
506 IFNG=4THEN RETURN
508 SD$=""
510 SYS49264,23,11,"<YEL>TURN ";NT;" THR
OW ";NG
512 IFNG)1THEN540
514 FORB=1TO5
516 R=INT(S#RND(1)+1.5)
518 D(B)=R:D2(B)=R
520 ONRGOSUB828,836,844,852,860,868
522 FORT=1TO200:NEXTT
524 NEXTB
526 GOSUB332:REM POSSIBILITIES
528 GOSUB824:REM ANYTHING TO SCORE
530 IFJ>0ORRE=1THENRE=0:I=0:GOSUB810:RET
URN
532 SD$=""
534 REM RE-ROLL FOR 3/4 KIND
536 REM POSITION OF DICE TO ROLL
538 NG=NG+1:GOTO506
540 FORTY=1TO13:PO(TY)=0:NEXTTY
542 GOSUB810
544 FORTY=1TO5:D(TY)=D2(TY):NEXTTY:GOSUB
332
546 FORWE=1TO6
548 IFU(A,WE)=0ANDFH(WE))0 THENMAX=WE
550 NEXTWE
552 FORE=1TO6
553 IFFH(E))=3ANDU(A,E)=1ANDU(A,7)=0THEN
MAX=E
554 IFFH(E))=3ANDU(A,E)=1ANDU(A,8)=0THEN
MAX=E
555 IFFH(E))=2ANDFH(E))=FH(MAX)ANDU(A,E)
=0THENMAX=E
556 IFFH(E))=2AND NT=13 ANDU(A,12)=0THEN
MAX=E
557 NEXTE
558 GOSUB810
560 FORE=1TO5:REM FIND POS OF NOT MAX
562 IFD2(E)<>MAXTHENSD#=SD#+STR$(E)
564 NEXTE
566 GOSUB810
568 IFSD#=""THEN 598
570 REM CLEAR AWAY DICE
572 LG=LEN(SD#)
574 FORD=1TO LG
576 D#=MID$(SD#,D,2)
578 B=VAL(D#):GOSUB820
580 NEXTD
582 REM ROLL WHERE SINGLE DICE WHERE
584 FORD=2TO LGSTEP2
586 D#=MID$(SD#,D,2):B=VAL(D#)
588 R=INT(S#RND(1)+1.5)
590 D2(B)=R
592 ONRGOSUB828,836,844,852,860,868
594 FORT=1TO200:NEXTT:NEXTD
596 MAX=0:REM RESET MAX
598 FORTY=1TO5:D(TY)=D2(TY):NEXTTY
600 GOSUB332:REM POSS
602 GOSUB824:REM ANY POSS SCORE
604 IFI=0THENGOSUB810:RETURN
606 IFJ>1THENJ=0:GOSUB810:RETURN
608 RETURN
610 S1=21:S2=116:REM YARTZEE SOUND
611 FORFS=1TO5
612 POKES4296,15:POKE54277,9:POKE54278,6
4:POKE54276,17
613 IFFS=2ORFS=4THENS1=S1+6:S2=S2+12
614 IFFS=3ORFS=5THENS1=S1+5:S2=S2+22
615 POKE54273,S1:POKE54272,S2
616 FORT=1TO500:NEXT
618 NEXT FS
620 POKE54273,0:POKE54272,0: POKE54276,0
'RETURN
624 REM MACHINE'S TURN TO ROLL & SCORE
626 REM STR'I'S
627 IFPO(12)=50ANDU(A,12)=0THENI=12:U(A,
12)=1:GOTO680
628 IFPO(9)=25ANDPO(8))0ANDU(A,8)=0THENU
(A,8)=1:I=8:GOTO680
630 IFPO(9)=25ANDPO(7))=25ANDU(A,7)=0THE
NU(A,7)=1:I=7:GOTO680
632 IFPO(11)=40ANDU(A,11)=0THENI=11:U(A,
11)=1:GOTO680
634 IFPO(10)=30ANDU(A,10)=0ANDU(A,11)=1T
HENI=10:U(A,10)=1:GOTO680
636 IFPO(10)=30ANDU(A,10)=1ANDU(A,11)=0A
NDNG<3THENRE=1:GOSUB734:GOTO632
638 IFPO(10)=30ANDU(A,10)=0ANDNG<3THENRE
=1:GOSUB734:GOTO632
640 IFPO(10)=30ANDU(A,10)=0ANDNG=3THENI=
10:U(A,10)=1:GOTO680
642 IFPO(8)>25ANDU(A,9)=0THENI=9:U(A,9)=
1:GOTO680
644 FORU=1TO6
646 IFFH(U)=4ANDU(A,U)=1ANDU(A,8)=0ANDNG
=3THENI=8:U(A,8)=1:GOTO680
648 NEXTU
650 REM
658 IFPO(8))0ANDU(A,8)=0ANDNG=3THENI=8:U
(A,8)=1:GOTO680
663 IFPO(7))=25ANDU(A,7)=0ANDNG=3THENI=7
:U(A,7)=1:GOTO680
664 FORP1=1TO6
666 IFFH(P1))=3ANDNG=3ANDU(A,P1)=0THENI=
P1:U(A,I)=1:SC(A,I)=PO(I):GOTO676
667 IFFH(P1))=3ANDU(A,P1)=1ANDU(A,7)=0AN
DNG<3THENMAX=P1
668 IFFH(P1)=3ANDU(A,P1)=1ANDU(A,7)=0TH
ENMAX=P1
669 IFFH(P1))=3ANDU(A,P1)=1ANDU(A,8)=0AN
DNG<3THENMAX=P1
670 IFFH(P1))=3ANDU(A,P1)=1ANDU(A,8)=0TH
ENMAX=P1
671 NEXTP1
672 IFPO(7))0ANDU(A,7)=0ANDNG=3THENI=7:U
(A,7)=1:GOTO680
673 IFI=0ANDNG=3THENGOSUB774:S=0
674 IFI>6THENGOTO680
676 X#=STR$(SC(A,I)):KL=I+1:JL=I+3
678 IFI>0THENSYS49264,KL,HP-LEN(X$),VAL(
X$)
680 FORU=1TO6
682 LET S=S+SC(A,U)
684 NEXTU
686 IFS)=63THENBO(A)=35
688 S=S+BO(A)
690 G#=STR$(S):S=0
692 IFBO(A)=35THENBO#=STR$(BO(A))
694 IFBO(A)=35THENSYS49264,8,HP-2,"<RON
>"MID#(BO#,2,2);"<ROF>"
696 IFI>0ANDNT=1THENSYS49264,9,HP-LEN(G#
),VAL(G#)
698 IFI>0ANDI<7ANDNG=3THENSYS49264,9,HP-
LEN(G#),VAL(G#)
```

16▶

PROGRAM NOTES

450-470	Calculate and print the upper total and gives a 35 point Bonus if you have reached 63.	536-558	Position of the dice to be re-rolled.	810-818	Clear and re-roll dice.
		610-620	Yahtzee sound.	820-826	Routine to clear each die.
472-488	Update and print the lower total.	624-740	Go through the same process for the computer as the player.	826-834	Routine to print a die showing '1'.
490-502	Update and print the grand total.	742-772	Find which dice to re-roll, then clear and re-roll.	836-874	Separate routines to print dice showing the values 2-6.
504-524	Computer's turn — gets five random dice.	774-808	Default values for categories.	876-1002	Instructions.
				2010-2030	Sound of the dice.
				8000-8015	Set the screen colour and scroll up the score board.

```
 700 G$=""
 702 IFI<0RTHENSC(A,I)=PO(I)
 704 X$=STR$(SC(A,I)):JL=I+3
 706 IFI>6ANDI<14THENS1S49264,JL,MP-LEN(X
 $),VAL(X$)
 708 IFI>0THEN NG=3:I=0
 710 IFI=0ANDNG<3THEN RETURN
 712 FORU=27TO13:REM LOWER TOTAL
 714 SB=SB+SC(A,U)
 716 NEXT U
 718 B$=STR$(SB)
 720 SYS49264,17,MP-LEN(B$),VAL(B$)
 722 FORU=1TO13:REM GRAND TOTAL
 724 GT=GT+SC(A,U)
 726 NEXTU
 728 GT=GT+BO(A):GT$=STR$(GT):GT(A,GA)=GT
 730 SYS49264,18,MP-LEN(GT$),VAL(GT$)
 732 RETURN
 734 REM
 736 REM TRY FOR LG STR IF SM.STR
 738 NG=NG+1:FORT=1TO500:NEXT
 740 SYS49264,23,11,"{YEL}TURN "+NT$+" THR
 OW "+NG
 742 REM FIND WHICH DICE TO RE-ROLL
 744 FORRY=1TO6
 746 IFFH(RY)=2 THENRN=RY
 748 NEXTRY
 750 FORRY=1TO5
 752 IFD2(RY)=RNTHENSD#=STR$(RY):RN=0
 754 NEXTRY
 756 GOSUB810:REM CLEAR & RE-ROLL
 758 B=VAL(SD#)
 760 GOSUB820:REM CLEAR
 762 FORSW=1TO5:D(SW)=D2(SW):NEXTSW
 764 R=INT(5*RND(1)+1.5)
 766 D2(B)=D(B)+R
 768 ONRGOSUB828,836,844,852,860,868
 770 GOSUB332:REM POSS
 772 RETURN
 774 REM DEFAULT VALUES FOR CATEGORIES
 776 FORRZ=1TO6
 778 S=S+SC(A,RZ)
 780 NEXTRZ
 782 FORM=1TO6
 784 IFI=0ANDU(A,M)=0ANDPO(M)+S=>63THENI=
 M:U(A,M)=1:SC(A,M)=PO(M):RETURN
 786 NEXTM
 788 FORJ=13 TO 11STEP-1
 790 IFI=0ANDU(A,JJ)=0THENI=JJ:U(A,JJ)=1:
 SC(A,JJ)=PO(JJ):RETURN
 792 NEXTJJ
 794 FORJJ=9TO7STEP-1
 796 IFI=0ANDU(A,JJ)=0THENI=JJ:U(A,JJ)=1:
 SC(A,JJ)=PO(JJ):RETURN
 798 NEXTJJ
 800 FORJ=1 TO 6
 802 IFI=0ANDU(A,JJ)=0THENI=JJ:U(A,JJ)=1:
 SC(A,JJ)=PO(JJ):RETURN
 804 NEXTJJ7
 806 IFI=0ANDU(A,10)=0THENU(A,10)=1:SC(A,
 10)=PO(10):RETURN
 808 RETURN
 810 REM RESET POSS TO 0
 812 FORRD=1TO 6:FH(RD)=0:NEXTRD
 814 FORRP=1TO13:PO(RP)=0:NEXTRP
 816 FORDW=1TO5:D(DW)=D2(DW):NEXTDW
 818 RETURN
 820 SYS49264,(B*4)-3,37,"{RON} {WHT}   "
 822 SYS49264,(B*4)-2,37,"{RON}    "
 824 SYS49264,(B*4)-1,37,"{RON}    "
 826 RETURN
 828 SYS49264,(B*4)-3,37,"{RON} {C=5}   "
 830 SYS49264,(B*4)-2,37,"{RON} {209}  "
 832 SYS49264,(B*4)-1,37,"{RON}   {YEL}"
 833 GOSUB2000
 834 PRINT"{ROF}":RETURN
 836 SYS49264,(B*4)-3,37,"{RON} {C=3} {209}
     "
 838 SYS49264,(B*4)-2,37,"{RON}    "
 840 SYS49264,(B*4)-1,37,"{RON}   {209}{YE
 L}"
 841 GOSUB2000
 842 PRINT"{ROF}":RETURN
 844 SYS49264,(B*4)-3,37,"{RON} {C=7} {209}
     "
 846 SYS49264,(B*4)-2,37,"{RON} {209}  "
 848 SYS49264,(B*4)-1,37,"{RON}   {209}{YE
 L}"
 849 GOSUB2000
 850 PRINT"{ROF}":RETURN
 852 SYS49264,(B*4)-3,37,"{RON}{YEL} {209}
  {209}"
 854 SYS49264,(B*4)-2,37,"{RON}    "
 856 SYS49264,(B*4)-1,37,"{RON}{209} {209
 }{YEL}"
 857 GOSUB2000
 858 PRINT"{ROF}":RETURN
 860 SYS49264,(B*4)-3,37,"{RON}{CYN}{209}
 {209}"
 862 SYS49264,(B*4)-2,37,"{RON} {209}  "
 864 SYS49264,(B*4)-1,37,"{RON}{209} {209
 }{YEL}"
 865 GOSUB2000
 866 PRINT"{ROF}":RETURN
 868 SYS49264,(B*4)-3,37,"{RON}{C=6}{209}
  {209}"
 870 SYS49264,(B*4)-2,37,"{RON}{209} {209
 }"
 872 SYS49264,(B*4)-1,37,"{RON}{209} {209
 }{YEL}"
 873 GOSUB2000
 874 PRINT"{ROF}":RETURN
 876 POKE53280,15:POKE53281,15:REM INSTRU
 CTIONS
 878 PRINT"{CLR}{BLK}      ****  INSTRUC
 TIONS  ****"
 880 PRINT"{DWN}YARTZEE IS A POPULAR GAME
  IN WHICH EACH"
 882 PRINT"{DWN}PLAYER SCORES THE VALUE O
 F HIS OR HER"
 884 PRINT"{DWN}DICE IN ONE OF SEVERAL CA
 TEGORIES."
 886 PRINT"{DWN}YOU START YOUR TURN BY RO
 LLING FIVE"
 888 PRINT"{DWN}DICE. YOU CAN THEN RE-ROL
 L AS MANY OF"
 890 PRINT"{DWN}THE DICE AS YOU WISH TWIC
 E MORE BEFORE"
 892 PRINT"{DWN}CHOOSING YOUR SCORING CAT
 EGORY."
 894 PRINT"{DWN}EACH OF THE 13 CATEGORIES
  HAS A RULE"
 896 PRINT"{DWN}          FOR SCORING"
 898 PRINT"{RED}{DWN}       PRESS SPACE BA
 R TO CONTINUE"
 900 GETS$:IF SP$=""THENS900
 902 IFSP$<>" "THEN900
 904 PRINT"{CLR}{BLU}THE RULES ARE AS FOL
 LOWS"
 906 PRINT"{DWN}{BLK}UPPER SECTION
 907 PRINT"{DWN}{BLK}CATEGORY          SCOR
 E"
 908 PRINT"{DWN}{PUR}1.ACES       SUM OF A
 LL ACES"
 910 PRINT"2.TWOS      SUM OF ALL TWOS
 912 PRINT"3.THREES    SUM OF ALL THREES
 914 PRINT"4.FOURS     SUM OF ALL FOURS
 915 PRINT"5.FIVES     SUM OF ALL FIVES"
 916 PRINT"6.SIXES     SUM OF ALL SIXES
 918 PRINT"{DWN}{DWN}{DWN}{BLK}IF THE TOT
 AL FOR THE UPPER SECTION IS"
 920 PRINT"{RED}63 PTS{BLK} OR MORE YOU G
 ET A BONUS OF {RED}35 PTS"
 922 PRINT"{BLK}{DWN}{DWN}{DWN}{DWN}{DWN}
 PRESS SPACE BAR TO CONTINUE"
 924 GETSP$:IF SP$=""THEN924
 926 PRINT"{CLR}{LOWER SECTION"
 927 PRINT"{BLK}CATEGORY          SCORE"
 928 PRINT"{DWN}{PUR}7.3/KIND       IF YO
 U HAVE 3 OF A KIND"
 930 PRINT"                  YOU SUM ALL DIC
 E"
 932 PRINT"{DWN}8.4/KIND        IF YOU HAV
 E 4 OF A KIND"
 934 PRINT"                  YOU SUM ALL DIC
 E"
 936 PRINT"{DWN}9.FL HOUSE      IF YOU HAV
 E 3 OF ONE &"
 938 PRINT"                  2 OF ANOTHER SC
 ORE 25PTS"
 940 PRINT"{DWN}10.SM.STRAIGHT IF YOU HAV
 E A SEQUENCE"
 942 PRINT"                  OF 4 DICE SCORE
  30PTS"
 944 PRINT"{DWN}11.LG.STRAIGHT IF YOU HAV
 E A SEQUENCE"
 946 PRINT"                  OF 5 DICE SCORE
  40PTS"
 948 PRINT"{DWN}12. YARTZEE     IF YOU HAV
 E 5 OF A KIND"
 950 PRINT"                  SCORE 50PTS"
 952 PRINT"{DWN}13. CHANCE      SUM OF ALL
  DICE"
 960 PRINT"{DWN}{RED}       PRESS SPACE BA
 R TO CONTINUE"
 962 GETSP$:IFSP$=""THEN962
 964 IFSP$<>" "THEN962
 966 PRINT"{CLR}{DWN}{BLK}RULES{CONT}
 968 PRINT"{185}{185}{185}{185}{185}{185}
 {185}{185}{185}{185}{185}"
 970 PRINT"{DWN}AFTER EACH TURN A PLAYER
 MUST SELECT"
 972 PRINT"ONE OF THESE CATEGORIES EVEN I
 F IT"
 974 PRINT"SCORES A ZERO"
 976 PRINT"THE GAME CONTINUES UNTIL ALL O
 F THE 13"
 978 PRINT"CATEGORIES HAVE BEEN USED"
 980 PRINT"{DWN}TO SAVE TIME YOU CAN ENTE
 R YOUR ROLLS"
 982 PRINT"AS {GRN}R24{BLK} IF YOU WISH T
 O ROLL DICE 2 AND 4"
 984 PRINT"{DWN}TO SCORE IN ANY GIVEN CAT
 EGORY"
 986 PRINT"ENTER {GRN}S{BLK} FOLLOWED BY
 THE NUMBER OF THAT"
 988 PRINT"CATEGORY E.G FOR CHANCE ENTER
 {GRN}S13"
 990 PRINT"{DWN}{DWN}{BLK}IF YOU WANT THE
  COMPUTER TO PLAY TYPE"
 992 PRINT"ANY NAME BEGINNING WITH 'CHIPS
 '
 994 PRINT"{DWN}{DWN}{DWN}LOOK AT INSTRUC
 TIONS AGAIN(Y/N)"
 996 GETO#:IFO#=""THEN996
 998 IFO#="Y"THEN 876
1000 IFO#="N"THEN POKE53280,11:POKE5328
 1,11:RETURN
1002 IFO#<>"Y"ORO#<>"N"THEN996
2000 REM DICE SOUND
2010 POKE54296,8:POKE54273,34:POKE54272,
 75:POKE54276,17:POKE54277,32
2020 POKE54278,64:FORT=1 TO 50:NEXT
2030 POKE54273,0:POKE54272,0:POKE54276,0
 :POKE54296,0:RETURN
8000 REM SCREEN COLOUR,CHANGE
8004 PRINT"{HOM}":RETURN
8005 FORJ=1TO19
8010 SYS49264,J,36,"{RON}{WHT}   {ROF}"
8015 NEXT J:PRINT"{HOM}":RETURN
```

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AZTEC ADVENTURE

Arcade-adventures look set to become the thing of the moment. Aztec takes Commodore 64 owners on a tomb-exploring tramp that is definitely not for the timorous. Mike Gerrard savoured that creepy feeling that there's always something lurking around the corner . . . waiting for you . . .

Any new title from Beyond Software is now sure to generate interest after its *Psytron* and *Lords of Midnight* stunners. So, when I was offered an exclusive look at *Aztec*, its new arcade/adventure release for the Commodore 64, you can be sure it was an opportunity not to pass up.

In fact, so new was the version I saw that it didn't turbo-load, as the finished product will, so while it was loading there was just enough time to read up on the entire history of the Aztec civilisation.

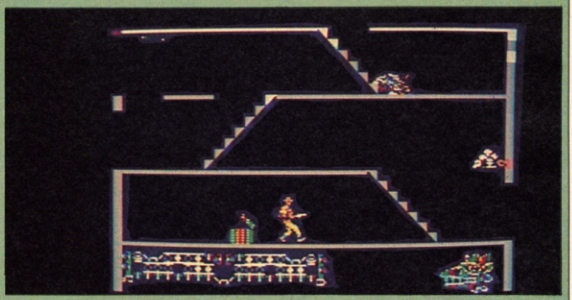
It is the entrance to the tomb of Quetzacoatl that noted archaeologist and tomb-robber Professor G von Foerster is rumoured to have discovered. Quetzacoatl was the nature god of various Indian tribes in Mexico before the Spanish conquest, whose symbol was the quetzal or royal bird — amazing what you can learn while waiting for a Commodore 64 to load.

You are a hero without a name, bearing a remarkable resemblance to Indiana Jones, and somehow you too are now standing at the entrance to the tomb, in which there is said to be a gold idol worth a fortune to anyone who can find it and return alive. The value of the idol is high to start with, but decreases steadily. If you can find it quickly on one of the highest of the eight skill levels then it could make you a millionaire, though the way I began playing I think I'll have to settle for its scrap metal value.

Aztec is entirely keyboard controlled, with 21 different instructions possible. Several of the controls are simply for moving yourself round the maze that makes up the tomb. Each of the innumerable screens is made up of two, three or more platforms, partly linked by ladders, and containing piles of rubbish, skulls, bones, nasties and possibly a box or two.

You press 'O' to open a box and 'L' to look inside. Why you should have to press two keys I will never understand. Are you going to open the box and then not look inside? The first box you come to contains Professor Foerster, who has the ability to be in several boxes at the same time. Which bits of him are in which box I leave to your imagination.

Sometimes the boxes contain machettes, bullets, pistols and dynamite, all of which you can 'T' for take, while 'Z' will give you an inventory at the foot of the screen. You begin with three energy units and three sticks of dynamite.



The dynamite is great fun, if you handle it wisely. You have to enter 'Crawl' mode by pressing the 'G' key and then you crawl slowly to any wall you wish to demolish, plant the dynamite with a 'P', then run like the clappers to the other side of the screen. Sometimes blowing up walls is merely experimentation to see what's on the other side, although it's also necessary should you tumble into a section from which there's no escape bar blowing your way out.

There is also one extremely nasty screen which contains a tap, and after a 'Look out!' warning the tap turns on to slowly fill the screen and drown you. If you take a fall and land in that screen your only hope is to plant dynamite at once and pray it goes off before the water starts running to put the fuse out.

Movement is by pressing the appropriate initial letters for Walk, Run, Jump and Climb, with 'S' to Stop you and 'A' and 'D' to turn left and right. When you're in the 'Fight' mode 'F' draws your gun or machette (unfortunately you don't seem to be able to choose which one you want), SPACE fires the gun (if you have bullets), with 'L' and 'M' to lunge or slash with the machette. 'W' takes you out of 'Fight' mode again.

The graphics making up the hero are quite detailed if a little jerky, and he is rather see-through, while he also seems to be wearing noisy boots for tomb-tramping. The sound effects are minimal, and this is certainly not a game to Ultimate's standards, yet it is very intriguing to play. There is always the suggestion that there's just a little more lurking round the corner. Nasties you come across include snakes, scorpions, pathers, dinosaurs and a giant ant. And if that doesn't bring the sweat to your brows, you also confront an Aztec warrior.

Another hazard is that in using the dynamite you might just blow up part of one of the staircases you need in order to get out again. At this point a warning of 'Trapped' appears on the screen. There's really nothing like stating the obvious.

The 'O' key can also be used to allow you to search through the piles of rubbish lying around (scruffy places, these Aztec tombs), which might reveal a bottle of some kind of elixir which adds to your strength (hard to tell as the instructions are still being printed). On the other hand it could reveal a stick of dynamite hissing away — you've got to 'R' for Run 'L' for Leather.

Those who like mapping out mazes will find this one a problem as it is different every time, and it is also sizeable as I discovered when I tried to walk in a straight-ish line through as many screens as possible towards the left. I ran out of strength before I ran out of screen. No mean feat considering the very genrous store of energy you're provided with.

Aztec has aspects of several different games, and is more arcade than adventure, but it certainly keeps you playing. After much effort and descending to the depths of the tomb I found the idol in one of the boxes, but I'd hardly enough strength to get anywhere, and this was on the easiest level. Even that game gave me another surprise because I was captured by the Aztec warrior and frog-marched away, eventually falling though a hole and being left to continue the game.

Aztec doesn't go further than Beyond's last two efforts, but it's definitely one worth seeking out for 64 fans who might feel a little deprived of this kind of arcade adventure.

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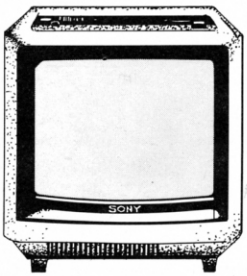

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GET UP AND GO GRAPHICS

Armed with a Spectrum, John Lettice sets out to show readers how to produce genuine, and convincing, moving graphics in cartoon-like sequences. Walt Disney would be proud.

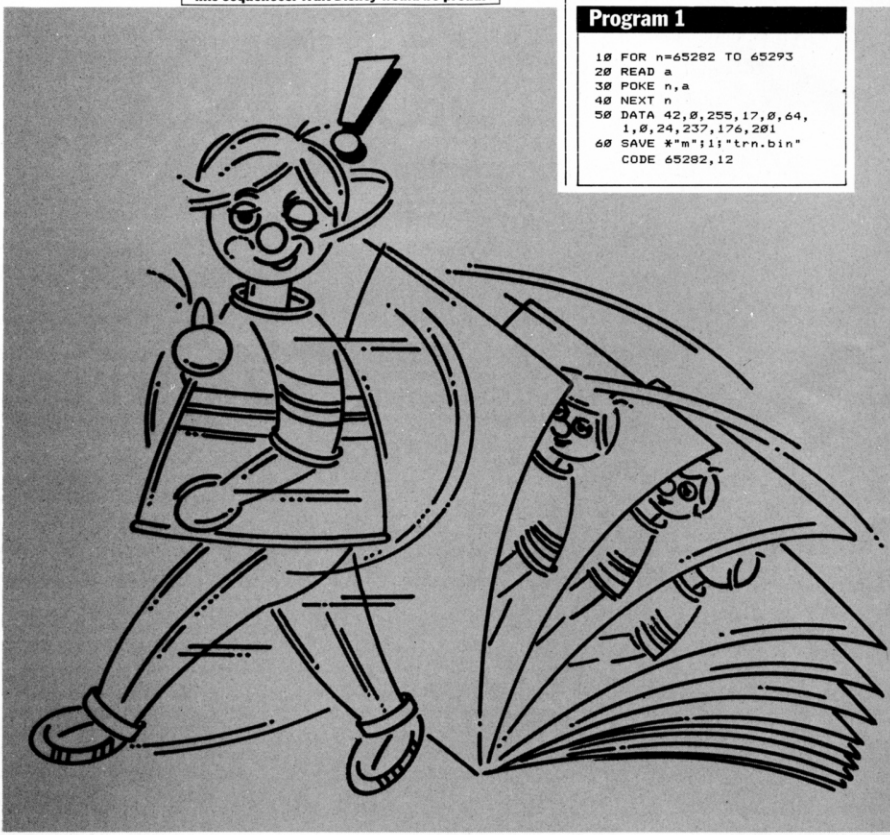
The principals behind animation are relatively easy to grasp. Walt Disney style, it's just a matter of taking one frame and changing it by degrees, then cycling through the slightly different frames you've got to provide the illusion of movement.

The effect is easy to duplicate on a micro. In the case of the Spectrum you can use Microdrives to store screens and just load them into screen memory as and when you need them, but this isn't fast enough to provide the illusion of movement. You can, however, produce convincing moving graphics by loading the screens into memory and then paging between them. This is so fast that you'll be able to produce genuine cartoon-style sequences.

The complexity of these sequences is basically dictated by the amount of memory available. A full screen on the Spectrum takes up 6192 bytes, so you

Program 1

```
10 FOR n=65282 TO 65293
20 READ a
30 POKE n,a
40 NEXT n
50 DATA 42,0,255,17,0,64,
   1,0,24,237,176,201
60 SAVE *"m";1;"trn.bin"
   CODE 65282,12
```



Program 2 — All H's in graphics should be solid blocks.

```
 10 REM animate program
 20 REM PCN 1984
 30:
 40 REM machine code data
 50 REM to be stored from
 60 REM location 65280
 70 REM to call the routine
 80 REM use:
 90 REM RANDOMIZE USR 65282
100:
110 DATA 0,0,33,0,64,237,91,0
120 DATA 255,1,0,24,237,176,201
130:
140 REM store data in memory
150:
155 RESTORE
160 FOR T=65280 TO 65294
170 READ A
180 POKE T,A
190 NEXT T
200:
210 REM now set up the drawing
215:
216 LET T=0
217:
220 PRINT "      HHH"
230 PRINT "     HHHHH"
240 PRINT "   HH H HH"
250 PRINT "   HH H HH"
260 PRINT "    HHHHH"
270 PRINT "    HH HH"
280 PRINT "     HHH"
290 PRINT "      H"
300 PRINT "     HHH"
310 PRINT "    HHHHH"
320 PRINT "  H HHH H"
330 PRINT "  H  H H  H"
340 PRINT "     HHH"
350 PRINT "     HHH"
360 PRINT "     H H"
370 PRINT "     H H"
380 PRINT "     H H"
390 PRINT "     HH HH"
400:
405 REM now store the picture
410 GO SUB 9000
480:
490 CLS
500 LET T=1
510:
520 PRINT "      HHH"
530 PRINT "     HHHHH"
540 PRINT "   HH HHHH"
550 PRINT "   HH H HH"
560 PRINT "    HHHHH"
570 PRINT "    HH HH"
580 PRINT "     HHH"
590 PRINT "      H"
600 PRINT "    HHHHHHH"
610 PRINT "    HHHH"
620 PRINT "  H HHH"
630 PRINT "  H  HHH"
640 PRINT "     HHH"
650 PRINT "     HHH"
660 PRINT "     H H"
670 PRINT "     H H"
680 PRINT "     H H"
690 PRINT "     HH HH"
700:
710 GO SUB 9000
720:
730 LET T=2
735 CLS
740:
750 PRINT "      HHH"
760 PRINT "     HHHHH"
770 PRINT "   HH HHHH"
780 PRINT "   HH HHHH"
790 PRINT "    HHHHH"
800 PRINT "    HH HH"
820 PRINT "     H"
830 PRINT "     HHH"
840 PRINT "    HHHHH"
850 PRINT "  H HHH H"
860 PRINT "  H  H H  H"
870 PRINT "     HHH"
880 PRINT "     HHH"
890 PRINT "     H H"
900 PRINT "     H H"
910 PRINT "     H H"
920 PRINT "     HH HH"
930:
940 GO SUB 9000
950:
960 CLS
970 LET T=3
980:
990 PRINT "      HHH"
1000 PRINT "     HHHHH"
1010 PRINT "   HH H HH"
1020 PRINT "   HH H HH"
1030 PRINT "    HHHHH"
1040 PRINT "    HHHHH"
1050 PRINT "     HHH"
1060 PRINT "      H"
1070 PRINT "     HHH"
1080 PRINT "    HHHHH"
1090 PRINT "  H HHH H"
1100 PRINT "  H  H H  H"
1110 PRINT "     HHH"
1120 PRINT "     HHH"
1130 PRINT "     H H"
1140 PRINT "     H H"
1150 PRINT "     H"
1160 PRINT "     HH"
1170:
1190 GO SUB 9000
1200:
1210 CLS
1220 LET T=4
1230:
1240 PRINT "      HHH"
1250 PRINT "     HHHHH"
1260 PRINT "   HH H HH"
1270 PRINT "   HH H HH"
1280 PRINT "    HHHHH"
1290 PRINT "    HH HH"
1300 PRINT "     HHH"
1310 PRINT "      H"
1320 PRINT "  HHHHHHHHH"
1330 PRINT "     HHH"
1340 PRINT "     HHH "
1350 PRINT "     H H"
1360 PRINT "     HHH"
1370 PRINT "     HHH"
1380 PRINT "     H H"
1390 PRINT "     H H"
1400 PRINT "     H H"
1410 PRINT "     HH HH"
1420:
1430 GO SUB 9000
1440:
1442 REM now save the screens
1446:
1450 SAVE *"m";1;"screens"CODE
30000, 35280
1460:
1470 STOP
1480:
9000 REM store screen in memory
9010:
9020 LET AD=30000+(T*6192)
9030 POKE 65280,AD-256*INT
     (AD/256)
9040 POKE 65281,INT (AD/256)
9050 RANDOMIZE USR 65282
9060 RETURN
```

can have a maximum of five different screens in memory at any one time. Now let's say you've got one very complex screen and you want to have a small object standing in the centre waving. The extra memory this would use is negligible, as you'd probably only be updating one or two character positions three or four times.

But from an illustrative point of view it's best to employ more of a scattergun approach. The routine presented here stores five screens in memory, and is therefore best used for highly complex graphics screens that show a lot of movement throughout the screen. Memory-guzzling programs, after all, should be made to earn their living.

The best way to use the routine is to draw a basic screen with a commercial graphics program, saving it as a SCREEN$ then amending it so that you eventually have five different frames stored on tape or Microdrive. It's then a simple matter of plugging a loading routine into the demonstration program to put the relevant data into the right areas of memory.

So, to draw something different, you simply have to plug a way of drawing five different screens into program 2 in lines 10 to 25.

The suite of programs here consists of three stages. Program 1 is used to POKE the data for the machine code transfer program into memory. When called with RANDOMIZE USR 65282 this takes the data from memory and POKES it into the screen memory. Program 2 draws the screens, while Program 3 is essentially a combined loading and paging routine. It loads the necessary data into memory and then cycles through the paging of the various frames.

The listings here were written to take advantage of the speed of the Microdrives, but although it takes longer to load them from tape, once they're in memory they'll work just as fast. If you're a tape user all you need do is remove the '*"m";1;' from each of the LOAD and SAVE commands.

Program 2 is the only one you need to vary for different drawings. The simple example shown just draws a figure using block graphics.

Program 3

```
  5 CLEAR 30000
 15 GO SUB 100
 20 FOR t=30000 TO 30000+
    (4*6192) STEP 6192
 30 POKE 65280,t-256* INT
    (t/256)
 40 POKE 65281, INT (t/256)
 50 RANDOMIZE USR 65282
 60 NEXT t
 70 GO TO 20
100 LOAD *"m";1;"trn.bin" CODE
106 LOAD *"m";1;"screens" CODE
110 RETURN
```

BREAK ON BBC

John Birtwistle guides BBC users through the Break key technique and David Rossiter doubles up the Vic 20's character height.

It's all very well restoring and re-running a Basic program by programming the Break key with OLDIM RUNIM but you lose all your variables, resident integer variables excepted. This is a disaster when you've spent hours filling up large Basic arrays with data.

However, the situation may be considerably retrieved by using the routine below, With careful programming you need not lose any essential variables.

When Break is pressed a jump to the Language Initalisation part of Basic is effected. this causes a partial reset of the system. The main Basic pointers PAGE, TOP. LOMEM. HIMEM etc are reinitialised with their default values. Also the set of pointers to the variables 'Heap' at &0482 to &04F9 and the pointer to the next free space in the 'Heap' at &02(&03) are also reset. The procedure PROCsaveptrs saves these pointers at a suitable early point in your program. The Break key is then programmed to restore them and return you to a suitable program re-entry point.

Make sure all your DIM statements and initialisation of global variables is carried out before PROCsaveptrs is called.

In particular, you should initialise any string variables to their maximum likely length by dummy assignments *eg* a$=STRING$(50,"*"). This enables virtually all your variables to be reinstated when done efficiently.

Note the essential use of resident variables A%,I% in the *KEY10 definition, or part of the 'Heap' is over-written before it has been restored. The storage space for the old 'Heap' pointers can be within the present program variables if DIM A% 125 is used as in the listing. If you are desperately short of space there is no reason why you shouldn't use A%=&C00 or any other assignment to suit your needs.

The restoration will of course be of the program and variables pointed to by the (reset) values of PAGE, TOP and LOMEM. Any moving of LOMEM etc during the course of your program produces possibly exciting but unpredictable results. The present technique could be extended to cope with these situations but not easily. It could, however, be a useful way of sharing variables among different programs either in memory or using disk overlays — but that's another much longer story.

Program 1

```
10 *KEY10 OLD!MFOR
   I%=0 TO &F9-&82:
   :?(&0482+I%)=?
   (A%+2+I%):NEXTI%
   :?&02=?A%:?&03=?
   (A%+1)!MGOTO 60!M
20 PROCinitialise
30 PRINT"Press <BREAK> now."
40 END
50 REM TEST LINES
60 A=10:B=20:C=30
70 PROCtestproc(A$(2))
80 PRINTb$(49)
90 PRINT A,B,C
100 REM END OF TEST LINES
110 END
120 DEF PROCtestproc(a$)
130 PRINT a$
140 ENDPROC
150 DEF PROCsaveptrs
160 LOCAL I%
170 FOR I%=0 TO &F9-&82
180 ?(A%+2+I%)=?(&0482+I%)
190 NEXT I%
200 ?A%=?&02:?(A%+1)=?&03
210 ENDPROC
220 DEF PROCinitialise
230 DIM A$(2),b$(50)
240 A$(2)="TEST STRING"
250 b$(49)="t.e.s.t."
260 DIM A% 125:PROCsaveptrs
270 ENDPROC
```

VIC 20: DOUBLE HEIGHT

This Vic 20 utility program comes from David Rossiter of Paignton, Devon, It allows characters to be printed in double height on the Vic's screen. Just type in the program, and save it before running. This is necessary as the code uses the cassette buffer and any use of the cassette filing system will scrub the code.

To switch on the double height, enter SYS 828, to switch off use POKE 36876,46:POKE 36879,240. The author suggests using these two subroutines:

50000 SYS 828:RETURN

60000 POKE 36879,46:POKE 36869,240:RETURN

Then simply GOSUB to the appropriate routine to switch the effect on and off.

Note that lower case characters are not covered by this routine and can only be used in normal mode.

Notes

10-80	Data for machine code.
100	Reset the data pointer
105	Read the data and look for the end of data pointer (-99).
110	POKE the data into the memory and continue reading.
120-130	Print the operating instructions onto the screen.

Program 1

```
10 DATA 32,80,3,32,96,3,32,141,3,32,192,3,32,121,
   3,76,152,3,96,96,173,0,128,141,0,20,141
20 DATA 1,20,96,0,0,0,0,0,0,173,81,3,201,255,240,
   25,238,81,3,96,17,17,96,17,17,2 38,84
30 DATA 3,238,85,3,76,151,3,32,141,3,32,192,3,96,
   238,81,3,238,82,3,76,106,3,96,3,0,0
40 DATA 173,84,3,201,255,240,220,238,84,3,96,173,
   81,3,201,255,240,3,76,60,3,173,82,3,201
50 DATA 131,208,147,76,175,3,0,0,0,169,153,141,3,
   144,169,253,141,5,144,76
60 DATA 212,3,234,234,234,234,173,87,3,201,255,
   240,4,238,87,3,96,238,87,3,238,88,3,76
70 DATA 202,3,169,128,141,82,3,169,20,141,85,3,
   141,88,3,169,0,141,81,3,141,84,3,169,1
80 DATA 141,87,3,96,32,-99
100 RESTORE:C=0
105 READ D:IF D=-99 THEN GOTO 120
110 POKE 828+C,D:C=C+1:GOTO 105
120 PRINT "[CLEAR SCREEN]DOUBLE MODE - SYS 828 "
130 PRINT "NORMAL - POKE 36867,46 WITH  POKE
    36869,240"
```

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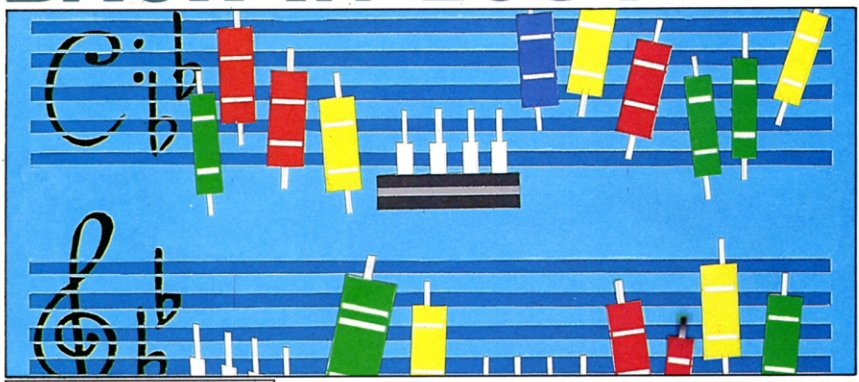
BACH IN 1984



A Bach chorus is played by your humble Atmos when you tap in Alan Wilkins' program.

If Bach had composed on a computer, what sort of music would have been the result?

Well, there's no need to speculate widely about that, because his approach was to impose his own style on an instrument — ask any musician.

Bach was not at all averse to re-arranging music for different instruments, and this arrangement of one of his cantata movements for the Oric Atmos follows precisely the same lines as his own arrangements of similar movements for the organ.

Although the requirements for the original work were an orchestra of strings with oboe, keyboard and four-part choir, the essential elements lie in only three parts, and these can be played on a micro.

In the program I have described the three parts as soprano, alto and bass. In the original, the soprano was played by violins and oboe, my alto was the choir soprano part, and the bass was the original bass part (as played by the orchestral bass instruments). As far as the notes themselves are concerned, I have followed the original precisely and altered nothing.

The little speaker on the Atmos does a good job of reproduction. But it has to be said that it can't really cope with the range of effects which the electronics can generate.

The first and easiest thing to do about this is to support the machine above bench level — a couple of books does the trick — so the speaker has room to breathe. This makes for a surprising improvement (mine sits permanently on a small frame).

For a decent sound, though, you must play anything elaborate through a hi-fi. All you need is a cable with a 5-pin DIN plug on each end. Connect the tape socket on the Atmos to the tape socket on your hi-fi.

Until you do this you won't know the real meaning of octave 1 in the MUSIC command and you won't hear a true bass. This lovely piece of Bach's needs and deserves the best treatment you can give it.

```
 ß~
 10 REM--PROGRAM TITLE - "HUMBLE"
 16 'Full title:-
 20 '"HUMBLE US BY THY GOODNESS"
 30 'Chorus by J.S.Bach
 40 'Arranged from the full score &
 50 'programmed for ORIC ATMOS by
 60 'Alan Wilkins.
 70 'August,1984.
 76 '
 80 GOSUB 6000'Display
 90 '
100 REM-VARIABLES
110 'S--Soprano data number
111 'SO-Soprano octave
112 'SN-Soprano note
114 'SL-Length of soprano note
115 'A--Alto data number
116 'AO-Alto octave
117 'AN-Alto note
118 'B--Bass data number
119 'BO-Bass octave
120 'BN-Bass note
121 'WA-Wait[used for note lengths]
122 'CH-Channel selection
```

```
123 'C,D-Counters
124 'FF-Flag for final chord
126 'FL-Flag for longer soprano note
128 'FR-Flag for repeated alto note
130 'FS-Flag for shake in soprano part.
140 '
180 '
190 REM--PROGRAM
194 '
200 WA=16
210 FF=FALSE
220 '
240 REPEAT
280 '
300 '--------------Set up bass and alto
320 '
330 CH=5'Alto part switched off.
340 FOR C=1 TO 2
360 FL=FALSE:FR=FALSE:FS=FALSE
380 READ B,A
400 IF A>300 THEN A=A-300:FS=TRUE
410 IF A>199 THEN A=A-200:FL=TRUE
420 IF A>100 THEN A=A-100:FR=TRUE
```

```
440 IF A>1 THEN CH=7'Alto part switched
on.
460 BO=INT(B/12):BN=B-BO*12+1
480 AO=INT(A/12):AN=A-AO*12+1
490 IF FL=TRUE THEN 600
494 IF FS=TRUE THEN GOSUB 1200:GOTO 940
500 '
520 '--------------Set up soprano
540 '
560 FOR D=1 TO 2
580 SL=2000
600 READ S
610 IF S>300 THEN S=S-300:FF=TRUE
620 IF S>200 THEN S=S-200:WA=WA+3'Final
bar
640 IF S>100 THEN S=S-100:SL=1200'Phras
e ending
650 '
660 SO=INT(S/12):SN=S-SO*12+1
680 '
700 '--------------Play
704 '
740 MUSIC 1,BO,BN,12
760 MUSIC 2,AO,AN,12
780 MUSIC 3,SO,SN,0
800 PLAY CH,0,1,SL
820 IF FR=TRUE AND D=2 THEN GOSUB 1600
830 IF FL=TRUE THEN WAIT WA+6:GOTO 940

840 WAIT WA-D*7
920 NEXT D
940 NEXT C
960 UNTIL FF=TRUE
1010 WAITWA/2
1020 PLAY 0,0,0,0
1040 WAIT 10
1060 MUSIC 1,0,11,12
1080 MUSIC 3,4,11,12
1100 PLAY 5,0,0,0
1120 WAIT 300:PLAY 0,0,0,0
1140 '
1160 END
1170 '
1190 REM--SBR-Shake in soprano part.
1194 '
1200 MUSIC 1,BO,BN,12
1210 MUSIC 3,5,3,0
1220 PLAY CH,0,1,1200
1230 WAIT WA/2
1240 MUSIC 3,5,4,0
1260 PLAY CH,0,1,1200
1270 WAIT WA/3
1280 MUSIC 3,5,3,0
1300 PLAY CH,0,1,1200
1330 WAIT WA/3
1340 MUSIC 3,5,4,0
1360 PLAY CH,0,1,1200
1370 WAIT WA/3
1380 MUSIC 3,5,3,0
1400 PLAY CH,0,1,1200
1410 WAIT WA/2
1420 RETURN
1580 '
1590 REM--SBR-Repeated alto note
1594 '
1600 PLAY 5,0,0,1000
1640 RETURN
1650 '
2000 '-------------Bar 1
2020 '
2040 DATA 10,0,62,60,22,0,62,63,21,0,65
,63,17,0,62,160
2060 DATA 7,0,58,57,19,0,58,60,17,0,62,
63,14,0,65,162
2080 '
2100 '-------------Bar 2
2120 '
2140 DATA 15,0,67,65,14,0,67,68,15,0,67
,65,12,0,63,62
2160 DATA 17,0,160,70,19,0,69,67,21,0,6
5,63,17,0,62,160
2180 '
2200 '-------------Bar 3
2220 '
2240 DATA 10,0,62,60,22,0,62,63,21,0,65
,62,17,0,63,165
2260 DATA 7,0,58,57,19,0,58,60,17,0,62,
58,14,0,60,162
2280 '
2300 '-------------Bar 4
2320 '
2340 DATA 15,0,55,57,12,0,58,63,17,200,
62,5,0,60,58
2360 DATA 10,0,158,70,17,0,69,67,22,46,
65,63,21,146,62,160
2380 '
2400 '-------------Bar 5
2420 '
2440 DATA 19,46,58,57,21,48,58,60,22,50
,62,60,19,50,58,157
2460 DATA 16,48,55,54,18,48,55,57,19,46
,58,60,15,46,62,158
2480 '
2500 '-------------Bar 6
2520 '
2540 DATA 12,45,63,62,9,45,60,58,14,45,
57,58,2,45,60,157
2560 DATA 7,43,58,57,19,43,58,60,17,0,6
2,60,14,0,58,157
2580 '
2600 '-------------Bar 7
2620 '
2640 DATA 3,0,55,54,15,0,55,57,14,0,58,
60,10,0,62,158
2660 DATA 12,0,63,62,24,0,63,65,23,0,67
,65,19,0,63,162
2680 '
2700 '-------------Bar 8
2720 '
2740 DATA 8,0,60,59,20,0,60,62,19,0,63,
65,15,0,67,63
2760 DATA 17,0,168,62,14,0,63,65,19,50,
59,62,7,50,67,165
2780 '
2800 '-------------Bar 9
2820 '
2840 DATA 12,51,63,62,24,51,60,62,21,48
,63,67,17,48,65,63
2860 DATA 22,50,162,58,19,50,57,58,15,4
8,60,62,17,48,63,165
2880 '
2900 '-------------Bar 10
2920 '
2940 DATA 10,46,62,60,22,46,62,63,21,46
,65,63,17,0,62,160
2960 DATA 7,0,58,57,19,0,58,60,17,0,62,
63,14,0,65,62
2980 '
3000 '-------------Bar 11
3020 '
3040 DATA 15,0,67,65,14,0,67,68,15,0,67
,65,12,0,63,62
3060 DATA 17,0,160,70,19,0,69,67,21,0,6
5,63,17,0,62,160
3080 '
3100 '-------------Bar 12
3120 '
3140 DATA 10,0,62,60,22,0,62,63,21,0,65
,62,17,0,63,165
```

29►

For home or business the IBM compatible

Advance 86a

16 Bit Micro-Computer

Under £350*

For the home user start with Model A with its massive 144K RAM and outstanding typewriter style keyboard that fits within the base unit for portability and storage.
Note the large return key and position of the numeric keyboard. Fast retrieval from storage and fast action on games is achieved by the use of the Intel 8086 True 16-bit micro-processor running at 4.77 MHz.
The Advance 86 runs IBM PC software.

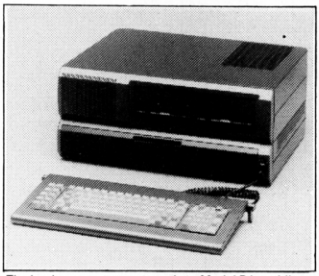
Specification

CPU Type	True 16-bit 8086 running at 4.77 MHz.
RAM	128K or 256K with parity plus 16K video
Languages Included	Basic
Type of Keyboard	Full 84 keys tactile
Keyboard Facilities	10 programmable keys
Character Set	256 in ROM
Method of Display	TV, RGB, Comp/Sync colour or monochrome monitor
Display Facilities	Full screen handling, 4 screen paged
Text	80 x 25 or 40 x 25
Graphics Resolution	320 x 200 or 640 x 200
Colours Available	16
Graphics Facilities	Scroll, reverse image
Cassette Recorder	Audio
Interfaces Included	Cassette port, light pen, joystick, Centronics
Sound	Built-in speaker
Operating System	Built-in ROM
Printers	Any using Centronics parallel interface
Comments	Hardware and software compatible with IBM PC Upgradeable to Model B Provision for 8087 Arithmetic Processor
Warranty	12 months

Benchmarks

The standard Benchmarks were run using Advance Basic, which is the equivalent of Microsoft GWBasic and Basica on the IBM PC.

Machine	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Av.
Advance 86 — 8086	0.8	3.3	7.3	7.4	8.1	14.6	23.9	26.0	11.4
ACT Apricot — 8086	1.6	5.2	10.6	11.0	12.4	22.9	35.4	34.4	16.7
IBM PC — 8088	1.2	4.8	11.7	12.2	13.4	23.3	37.4	30.0	16.8



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Tel: 01-609 0061 for leaflet:

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*Ex VAT.

To Advance Technology UK Ltd., 8A Hornsey Street, London N7 8HB

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☐ Please send Model 86B which includes Model 86A plus Expansion Box & Software. I enclose £1499 inc. VAT.
☐ Please send 128K Memory Expansion £125 inc. VAT. Cheque/Barclaycard/Access No. _____

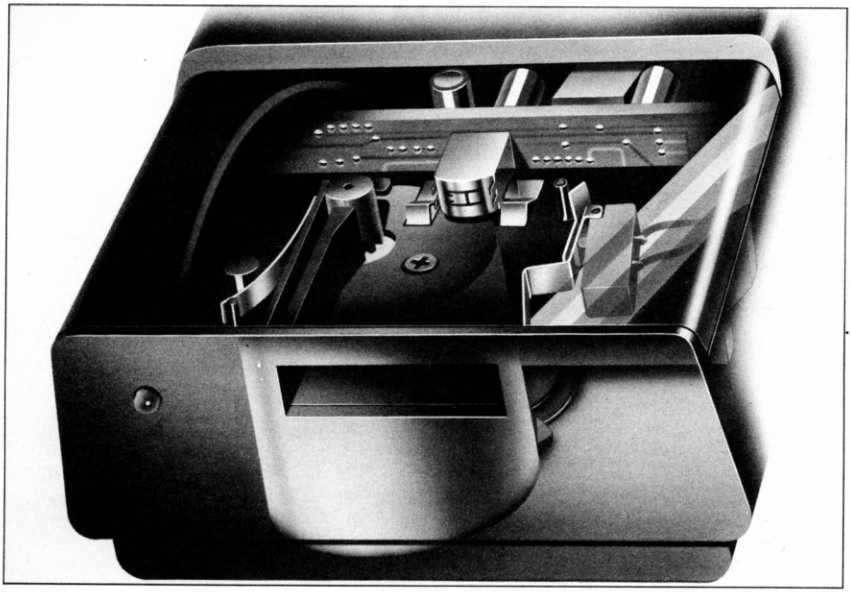
Name _____ Company _____
Address _____ Address _____

PCN1

```
 3160 DATA 7,0,58,57,19,0,58,60,17,0,62,
58,14,0,60,162
 3180 '
 3200 '-------------Bar 13
 3220 '
 3240 DATA 15,0,55,57,12,0,58,63,17,200,
62,5,0,60,58
 3260 DATA 10,0,158,70,17,0,69,67,22,46,
65,63,21,146,62,160
 3280 '
 3300 '-------------Bar 14
 3320 '
 3340 DATA 19,46,58,57,21,48,58,60,22,50
,62,60,19,50,58,157
 3360 DATA 16,48,55,54,18,48,55,57,19,46
,58,60,15,46,62,158
 3380 '
 3400 '-------------Bar 15
 3420 '
 3440 DATA 12,45,63,62,9,45,60,58,14,45,
57,58,2,45,60,157
 3460 DATA 7,43,58,57,19,43,58,60,17,0,6
2,60,14,0,58,157
 3480 '
 3500 '-------------Bar 16
 3520 '
 3540 DATA 3,0,55,54,15,0,55,57,14,0,58,
60,10,0,62,158
 3560 DATA 12,0,63,62,24,0,63,65,23,0,67
,65,19,0,63,162
 3580 '
 3600 '-------------Bar 17
 3620 '
 3640 DATA 8,0,60,59,20,0,60,62,19,0,63,
65,15,0,67,63
 3660 DATA 17,0,168,62,14,0,63,165,19,50
,59,62,7,50,67,165
 3680 '
 3700 '-------------Bar 18
 3720 '
 3740 DATA 12,51,63,62,24,51,60,62,21,48
,63,67,17,48,65,63
 3760 DATA 22,50,162,58,19,50,57,58,15,4
8,60,62,17,48,63,165
 3780 '
 3800 '-------------Bar 19
 3820 '
 3840 DATA 10,46,62,60,22,46,62,63,21,0,
65,63,17,0,62,160
 3860 DATA 7,0,58,57,19,0,58,60,17,0,62,
63,14,0,65,62
 3880 '
 3900 '-------------Bar 20
 3920 '
 3940 DATA 15,0,67,65,14,0,67,68,15,0,67
,65,12,0,63,62
 3960 DATA 17,0,160,70,19,0,69,67,21,0,6
5,63,17,0,62,160
 3980 '
 4000 '-------------Bar 21
 4020 '
 4040 DATA 10,0,62,60,22,0,62,63,21,0,65
,62,17,0,63,165
 4060 DATA 7,0,58,57,19,0,58,60,17,0,62,
58,14,0,60,162
 4080 '
 4100 '-------------Bar 22
 4120 '
 4140 DATA 15,0,55,57,12,0,58,63,17,200,
62,5,0,60,58
 4160 DATA 10,0,58,70,17,0,69,67,22,46,6
5,63,21,48,62,60
 4180 '
 4200 '-------------Bar 23
 4220 '
 4240 DATA 19,50,58,57,21,150,58,60,22,5
0,62,60,19,50,58,157
 4260 DATA 12,51,55,60,24,51,62,63,21,48
,65,63,17,48,62,160
 4300 '-------------Bar 24
 4340 DATA 14,53,58,53,12,53,55,57,14,51
,58,57,15,50,55,158
 4360 DATA 5,48,57,55,17,48,57,58,16,0,6
0,58,12,0,57,155
 4400 '-------------Bar 25
 4440 DATA 2,0,53,52,14,0,53,55,12,0,57,
58,9,0,60,157
 4460 DATA 10,0,62,60,22,0,62,63,21,0,65
,63,17,0,62,160
 4500 '-------------Bar 26
 4540 DATA 7,0,58,57,19,0,58,60,17,0,62,
58,14,0,60,62
 4560 DATA 15,0,55,57,12,0,58,63,17,253,
62,5,53,60,58
 4600 '-------------Bar 27
 4640 DATA 10,50,58,57,22,150,58,60,19,5
0,62,60,14,50,58,157
 4660 DATA 3,48,55,54,15,48,55,57,14,46,
58,60,10,46,62,158
 4700 '-------------Bar 28
 4740 DATA 12,45,163,62,9,45,60,58,14,45
,157,58,2,45,60,157
 4760 DATA 7,43,58,57,19,43,58,60,17,0,6
2,60,14,0,58,157
 4800 '-------------Bar 29
 4840 DATA 3,0,55,54,15,0,55,57,14,0,58,
60,10,0,62,158
 4860 DATA 12,0,63,62,24,0,63,65,23,0,67
,65,19,0,63,162
 4900 '-------------Bar 30
 4940 DATA 8,0,60,59,20,0,60,62,19,0,63,
65,15,0,67,63
 4960 DATA 17,0,168,62,10,0,63,165,19,50
,59,62,7,50,67,165
 5000 '-------------Bar 31
 5040 DATA 12,51,63,62,24,51,60,62,21,48
,63,67,17,48,65,63
 5060 DATA 22,50,162,58,19,50,57,58,15,4
8,60,62,17,48,63,165
 5096 '-------------Bar 32
 5140 DATA 10,46,62,60,22,46,62,63,21,0,
65,63,17,0,62,160
 5160 DATA 7,0,58,57,19,0,58,60,17,0,62,
63,14,0,65,162
 5200 '-------------Bar 33
 5240 DATA 15,0,67,65,14,0,67,68,15,0,67
,65,12,0,63,62
 5260 DATA 17,0,160,70,19,0,69,67,21,0,6
5,63,17,0,62,160
 5300 '-------------Bar 34
 5340 DATA 10,0,62,60,22,0,62,63,21,0,65
,62,17,0,63,165
 5360 DATA 7,0,58,57,19,0,58,60,17,0,62,
58,14,0,60,162
 5400 '-------------Bar 35
 5440 DATA 15,0,255,257,12,0,258,263,17,
301,5,0,60,358
 5460 DATA 10,0,58
 6000 REM--DISPLAY
 6006 CLS
 6008 PRINTCHR$(17)
 6010 PAPER 6:INK 0
 6020 PRINT@6,1;"HUMBLE US BY THY GOODN
ESS"
 6040 PRINT@18,3;"by"
 6060 PRINT@15,5;"J.S.BACH"
 6080 PRINT@5,9;"An arrangement of a cho
rus from"
 6100 PRINT"church cantata no.22."
 7060 PRINT SPC(17)CHR$(96)"-Alan Wilkin
s-1984"
 7080 RETURN
```

MOBILE MICRODRIVE

Simon Goodwin presents a compendium of useful information for the Sinclair QL system and a handy program for making back-up copies for your Microdrive cartridges.



This week we're taking a brisk tour of the QL system, with a collection of hints and tips about the Microdrives, keyboard and display.

Duplicart

Duplicart is a general-purpose program which can create a back-up copy of your QL cartridge. Just put the original cartridge in drive 1, a blank in drive 2, and RUN the program. A minute or so later you can pour coffee over the original cartridge, secure in the knowledge that you've got a duplicate.

You have probably used the 'clone' programs supplied with each QL package. These were specially written to copy the files on a specific cartridge so that, for instance, the Quill clone can't copy the Archive files, and vice versa.

Duplicart does not have this restriction and will save you a lot of work typing COPY statements whenever you want to make a security copy of a cartridge. This in turn saves a lot of work when your cartridge decides to (literally) get knotted. Microdrives are not the most reliable of gadgets, and anything that makes it easier to back them up must make the Sinclair QL more usable.

Duplicart works by formatting the blank cartridge and copying the directory of the original into a temporary file there. This file is read into memory and the names are extracted to generate a set of COPY statements which transfer the files automatically.

Faulty piping

Ideally I would have used a 'pipe' to store the directory, instead of a temporary file. A pipe is a temporary file which is created in memory rather than on cartridge. It should be possible to 'pour' data into one end of a pipe and read it out later (perhaps while the pouring is still going on), but in practice I had no joy at all in reading data back from the pipe. The commands:

```
OPEN #3,pipe_2000
DIR #3,mdv1_
```

Will happily squirt the directory listing into a pipe 2,000 characters long, but no amount of coaxing would bring the data out of the pipe. Perhaps this secret feature of the QL will become more useful when Sinclair tell us how to use the machine's 'multi-tasking' facilities.

As it is, Duplicart reads the directory listing from cartridge into the unimaginatively named array NAME$, and then the directory file is deleted. The number of files is shown when copying begins — a maximum of 50 files can be copied by the program at one go. The names are printed one by one as files are duplicated.

A simple procedure has been defined to make it easy for you to copy individual files while Duplicart is loaded. If your file is called PCN, you need only type:

```
C PCN
```

to copy the file from drive 1 to drive 2.

You may find that your QL works better if files are copied from the right hand drive (number 2) to the left hand one.

Early QLs had undersized cooling plates behind the second Microdrive which could lead to overheating and unreliable saveing on that drive. The reverse is true on other machines, which suffer from interference between drive 1, (on the left) and the logic array on the circuit board nearby. If in doubt, swap over the drive names throughout the

listing and see if that increases the speed at which files are copied.

Make sure that you change the message on lines 190-210 if you reverse the copying sequence. If you confuse the source and destination cartridges you could end up scrubbing the data you are trying to duplicate.

In the interests of speed Duplicart only formats a cartridge once before copying onto it. Repeated formatting can condition the tape so that it will hold more data, so it is a good idea to use a couple of explicit FORMAT commands before you copy a cartridge which is very full.

Remember that the capacity of QL cartridges does vary, although not as much as their Spectrum counterparts, so it is not a good idea to fill cartridges completely — you could end up having trouble finding a backup cartridge which will accommodate all of the data.

There are a number of ways in which Duplicart could be improved. A question and answer sequence could be added to allow files to be selected for copying, and the program could be adapted to handle other devices. As it stands, Duplicart is a short, efficient program which takes a lot of the hassle and worry out of using the QL.

Key notes

If you find the QL keyboard irritating you may be interested in a few POKES which allow you to alter its characteristics.

Should the auto-repeat rate be too fast for your tastes, use POKE 163983, N to alter the delay between repetitions of a keypress. The normal value of N is 2, which represents a delay of 1/25 second. The value is in multiples of 1/50 second (or 1/60 second on US models), so that POKE 163983,5 would reduce the repeat rate to a rather more pedestrian 10 characters per second.

The delay before repetition starts is controlled by the value at address 163981. Again the delay is in units of 1/50 second. The normal value is 30, which means that characters start to repeat after they have been held down for 3/5 second. Use POKE 163981,50 to select a one second delay, or POKE W 163980,32000 to turn off the repetition altogether.

It is possible to select Caps Lock from within a program. This can be useful if you want to save yourself the trouble of converting input strings into capital or small letters, use POKE 163976,1 to select Caps Lock and POKE 163976,0 to turn it off.

Sadly, we can't find a POKE which stops the plastic legs falling off the back of the computer.

Closing the windows

Quite a few QL users seem to have problems reading all the characters on the screen, even if F2 is pressed when the computer is turned on, selecting the TV display. This is because the computer tries to display characters at or beyond the left-hand margin of the TV screen.

The following commands give a clear and readable screen on an aging Hitachi TV:

```
MODE 1
BORDER 4,0
BORDER #0,4,0
BORDER #2,4,0
```

The first statement selects smaller characters, although still using the narrow TV display area. Paradoxically this makes the text easier to read on most TVs we have tested — the large characters otherwise used are so crudely-formed that they are hard to read.

The BORDER statements aren't well explained in the QL manual. The first of these adds a black border to window 1, which is used by PRINT statements. The next two commands give the same treatment to window 0 (the command area, at the bottom of the screen) and window 2, used for program listings.

If your TV doesn't cope very well with MODE 1, try the compromise of MODE 1 together with CSIZE #0,1,0: CSIZE 1,0: CSIZE #2,1,0. This spaces out the characters in each window, making them easier to read.

Program listing — Duplicart

```
80 REMark Duplicart (c) 1984 Simon N Goodwin
90 REMark Version 0.2 26th August 1984
100 MODE 1
120 DIM name$(50,32)
130 BORDER 4,110
140 BORDER 8,128
150 CSIZE 3,1
160 AT 1,8
170 PRINT "DUPLICART!"\\
180 CSIZE 1,0
190 PRINT"Put the cartridge to be copied in
    the LEFT drive and"
200 PRINT"the blank cartridge to be filled in
    the RIGHT drive."\\
210 PRINT"Press ENTER when you are SURE you're
    ready to start."
220 INPUT a$
230 FORMAT #0,mdv2_
235 REMark Read source directory onto
    destination cart.
240 OPEN_NEW #3,mdv2_direct
250 DIR #3,mdv1_
260 CLOSE #3
265 REMark Extract filenames
270 PAPER 0
280 OPEN #3,mdv2_direct
290 INPUT #3,n$:PRINT "Cartridge Name: ";n$;
300 i=0 :REMark First 'name' is sector data
310 REPeat get_names
320   INPUT #3,name$(i)
330   IF EOF(#3) THEN EXIT get_names
340   i=i+1
350   END REPeat get_names
360 CLOSE #3
370 PRINT" (";i;" files)",
380 DELETE mdv2_direct
385 REMark Copy each file
390 FOR j=1 TO i:PRINT !name$(j),:c name$(j)
400 PRINT"FINISHED!"
410 FOR i=0 TO 30:BEEP 100,i
420 STOP
430 DEFine PROCedure c(a): COPY "mdv1_" & a TO
    "mdv2_" & a: END DEFine c
```

COMPAQ GOES PROFESSIONAL

Compaq has followed the fashion for more IBMability than Big Blue's own PC. Geof Wheelwright reports on the company's new desktop micro.

Compaq Computer, the company that made its name by releasing a better-than-IBM portable long before IBM inflicted its own on the market (issue 54), has announced a desktop IBM compatible.

Dubbed the Compaq Deskpro, the machine is offered in four configurations starting with a 128K RAM, single disk drive version with six IBM PC compatible expansion slots.

The release of the Deskpro may seem an odd move for a company which — it could be argued — owes much of its first year success ($111 million in 1983 alone) to the fact that it had a portable and IBM did not.

There are two main reasons why it's not so odd. First, and probably most important, is the need for Compaq to develop an image as a multi-product company. Although it's fine to have a best-selling portable on the market when it's in big demand (remember Osborne?), a range of machines is considered necessary to maintain growth and success.

Second, Compaq saw the opportunity to offer an IBM-style desktop machine with more inside it than IBM has ever offered on its PC. Although Compaq may be joined by a large number of others in this respect, a lot of 8086-based machines (the Tandy Model 2000 for example) that currently run MSDOS can't run off-the-shelf IBM PC software — and fewer still can use ordinary IBM PC expansion cards. None that I've seen offer as high an upgrade path as this machine — but more about that later.

Features

The machine is unique in that it uses the faster 8086 16-bit processor, but can run all PC software and use all PC expansion boards with no hardware modifications. It can also be expanded to 640K RAM on the main board of the machine and use twin floppies alongside both a 10Mb hard disk and a 10Mb fixed disk tape back-up.

It all looks a pretty daunting prospect when you see a huge package like *Symphony* (minimum requirement 320K RAM) loaded into RAM, and then reflect on the fact that there's still up to another 320K left — as well as more than 10Mb on the drives and hard disk. But it all comes at a price — in the US the fully-configured machine will cost more than $7,000. Final UK prices will be announced this week, although they are expected to range from about £1,900 for the 'Model One' (128K RAM, one drive, six expansion slots) to about £6,000 for the fully-configured system.

I conducted this Pre-Test on the fully-configured system, with two drives, tape back-up and 10Mb hard disk.

Keyboard

Unlike its portable relations, the Deskpro's keyboard can be plugged in and out of the machine via a jack conveniently placed at the front of the machine. Compaq offers a variety of keyboards for the Deskpro — all based, of course, around the IBM PC design. Although the most common is an IBM clone with its positive feedback clicking and a good spring, Compaq also offers a 'silent' keyboard with harder-to-press keys and no clicking. I used this silent keyboard in the test and found it to be sturdy and well-built.

Interfaces

The Deskpro comes standard in all configurations with a parallel printer interface, as well as RGB composite video and RF outputs. On both the hard disk models (one with a single drive and no tape back-up and the other with tape and a second drive), an asynchronous communications board with real-time battery-backed clock is also included in the basic price. The addition of these extras does, however, reduce the number of available expansion slots from six on the entry-level machine to four on both the hard-disk versions.

Perhaps the most important interface in the whole package is the main board and its attendant expansion slots. The main board can take up to 640K RAM, which leaves all the other slots open for non-memory expansion cards. You could theoretically use one of the other slots to take the memory up to 1Mb but MSDOS would not be able to address that memory. You would have to use a more complex operating system such as Unix to get at it.

In use

The Deskpro behaved just like an IBM — only a little faster. Compaq claims the 8086 processor makes the Deskpro up to three times faster than IBM's PC. I can't say whether it's as much as three times, but the Deskpro did seem to move quickly — and it tackled all the IBM PC software I could throw at it — including *Open Access*, the ever present *Flight Simulator* and *Symphony*.

It operates in two speeds — 'fast' or 'common'. The fast mode means that software is running directly under the 8086 and uses the quicker addressing

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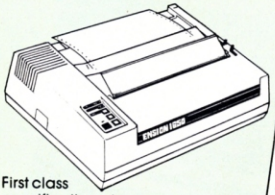

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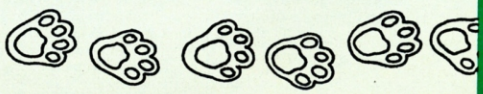

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provided by that processor. However, Compaq figures there may be some IBM software that doesn't like the fast mode and will need to run under an 8088 — so the common environment provides a kind of 8088 emulation in which you can use 'fussy' packages. All the IBM software I tested with the machine ran in both modes.

The fast and common modes are toggled quite easily — by holding down the Control, Alt and backslash keys at the same time. A small light, just to the left of the disk drives, turns either green or red depending on whether you're running in common or fast mode (green for fast, red for common). You can make this change at any time within any program — switching between one and the other in Basic really shows up the difference in speeds.

Software

No software is bundled except for MSDOS. However, since the Deskpro should run any piece of IBM PC software you care to use (providing you've got the right memory and interfaces), you will not be stuck for things to run on it.

It also means that you will be able to run any one of the many memory-hungry integrated software packages currently hitting the market — without having to worry about either the memory expansion or special software configuration needed for your machine. The lack of any bundled software does mean that if your needs are modest and your finances equally so, then you might do better to look at a less ambitious system.

Offerings like the Advance 86b, which claims both software and hardware compatibility and comes with the Perfect series of software bundled into the low price of the machine (less than £1,500 for a twin-disk model) and the Sanyo MBC-550 range, which bundles the Micropro/Wordstar packages for under £1,000 — will probably be more up your street.

That isn't to say that the Deskpro is not good value — it is better constructed than either of the two cheaper rivals I mentioned and probably more IBM-compatible — but it does mean that you pay for what you get. And what you get with the Deskpro is a very nice — but medium-priced — IBM desktop machine.

Competition

A good business alternative to the IBM PC. It will be difficult for Compaq to be price-competitive in the lower end of PC market. Although the Deskpro is better built than the IBM (it uses the same metal-frame suspension system as the portable — which I have seen a Compaq executive happily drop from a height of five feet to demonstrate) and comes with more interfaces for the same money.

The Deskpro really comes into its own in the upper end of the market, where there just aren't too many machines that will have as much on them as the top-of-the-line Deskpro — and where faster 8086 machines don't generally offer direct card and software compatibility.

Alternatives here would include the Olivetti M24, which could probably match the Desk-pro on speed — although it would lose out on the ultimate level of expandability and the ability to use IBM expansion cards and the Tandy Model 2000 which again uses the faster processor, but offers neither direct software or hardware IBM compatibility.

The big question mark for Compaq must surely be the reaction to IBM's own upmarket PC — the new IBM PC/AT. Ironically enough, although the new Big Blue machine will run about three times as fast as its PC and offers both Unix and a new PCDOS, IBM is not offering complete software compatability with the PC. So, to get complete IBM compatibility combined with a speed increase, you'll need to look to Compaq rather than IBM.

The conventional wisdom, however, is that the AT and its new PCDOS are designed to put companies like Compaq out on a limb. IBM can now say that 'you (Compaq) may have achieved compatability with our *old* computer, but we have moved on to something bigger and better and you and all the other compatible manufacturers will be left behind'.

Whether or not people will accept that reaction and abandon the 'old' PCDOS and new machines like the Deskpro in favour of the AT is a question only time will tell.

Verdict

In its own right the Deskpro is a sturdy, well-designed machine. It isn't cheap, but then neither are its competitors. The degree of expandability built into the system will ensure that it can be adapted to most businesses.

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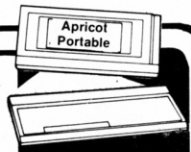

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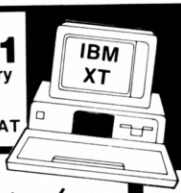

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PHLOOPY HANGS ON

Disk drives for the BBC micro are still expensive. David Janda reports on Phloopy, one of the latest contenders to join the ranks of the cheaper alternatives, and he remains stoically unimpressed.

Disk drives for the BBC micro cost a fair bit, and cheaper alternatives are welcomed with open arms by people who've already forked out the readies for the basic computer. Phi Mag Systems has entered the disk alternative market with the Phloopy, a tape-based filing system.

Unfortunately, after using the system for some time, I have to say the other disk alternative manufacturers have little to worry about.

Features

Basically, the Phloopy is a fast tape drive controlled by software on the now standard plug-in EPROM. Cartridges — containing 12 feet of continuous tape — store up to 100K of programs and data. The Phloopy scores over the standard cassette, on counts of speed and facilities.

The facilities resemble those you get with a disk drive. Most of the star commands are supported, and from Basic you can use PTR£, so fancy file handling is fairly easy.

The system is controlled by the Loop File System (LFS), held on the EPROM. Control over the Phloopy is by entering commands at the keyboard, as there are no manual controls on the Phloopy itself.

With the software, the only noteworthy feature is that Page is at &1700. Unlike the Acorn DFS, there is a FORMAT command within the LFS as well as TRANSFER which is used to copy tapes to the Phloopy.

What the Phloopy has not got is a wildcard facility, or a file compactor (essential on tape systems).

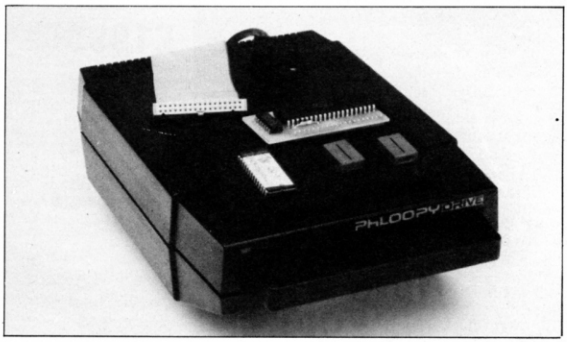
Documentation

The 63-page manual supplied with the package is excellent. The section on setting up is clear with its step-by-step format and a couple of good diagrams. The rest of the manual is dedicated to a breakdown of the LFS commands with small one-line examples.

Setting up

The Phloopy comes in three parts. The main part is a lightweight yet bulky affair and larger than many cassette recorders. From it fly two cables, a ribbon cable that plugs into the Drive socket on the Beeb, and a power cable which plugs into the auxiliary power supply. Then there is the Phloopy controller board which is inserted into IC78, and the LFS Eprom.

Setting up is a little tricky. The most difficult part is inserting the Phloopy controller board. This is a small printed circuit board (PCB) which contains the 40-pin controller chip. The base of the PCB actually hides the pins, so it was a little tricky inserting it. The next step is to cut the wires leading to the two resistors R22 and R23. A couple of 14-pin connectors are then inserted into ICs 79 and 80, and the LFS Eprom into a spare socket, and that's it.



In use

It really bugs me when manufacturers release their wares without testing them properly. This is the case with the Phloopy. After only an hour's casual use I found some serious bugs (version 1.0). First, writing or reading to a file using BPUT, BGET, INPUT and PRINT would not work correctly with the result of corrupted files.

This really came to light when I used Wordwise. After reloading a saved file, I would find that bits of the text were missing. The problems were all related to one bug, but I am amazed that Phi Mag missed it. On informing them of the nasties, Phi Mag released a fixed version (V 1.3) within four days and told me existing users would have their Eproms replaced.

In use, (at last), the first thing I noticed was that the Phloopy rattled when the drive was idle. This quietens down to a swish when the drive is active. Inserting a cartridge results in it being rewound to the start of the tape after every Phloopy operation, and the process takes a boring 13 seconds.

Using the Phloopy was fine but slow. It's an alternative to disk but leaves much to be desired, although it beats using a cassette. The Phloopy would be better treated as a fast tape system (which it is) rather than as a disk. The point to this argument is that using the Beeb's Drive port rules out the possibility of using it for disk archive purposes.

Verdict

Bugs aside, I was still not impressed with the Phloopy. The thing is bulky and noisy and the cartridges are not just large, but expensive at just under £4 each. In fact, the whole unit may be overpriced and if you can't afford a disk, I would still strongly recommend you to take a good look at the Ultradrive from Ikon (about £80).

Name Phloopy Loop Filing System **System** BBC micro **Manufacturer** Phi Mag Systems, Falmouth (0326) 76040 **Price** Phloopy £113.85, Interface £29.90, Pack of five cartridges £19.75.

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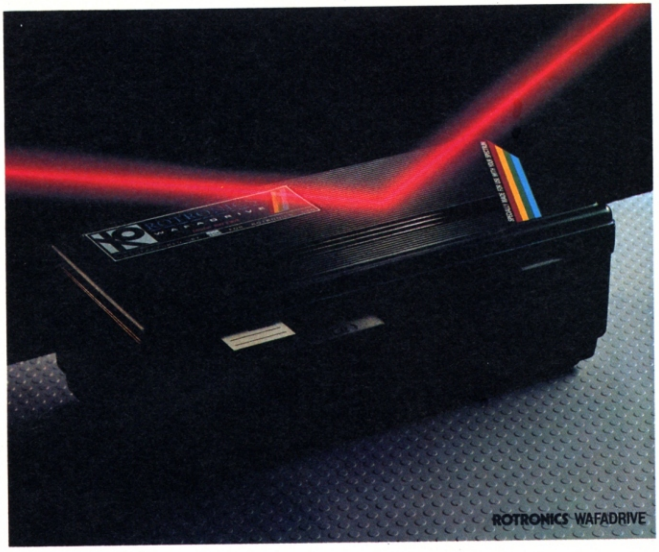

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Software

Armed with the comprehensive user manual, blank wafer and word processor supplied, you can use your Wafadrive straight away. There is also a rapidly growing range of software to enable the programmer and games player to exploit the Wafadrive system to the full.

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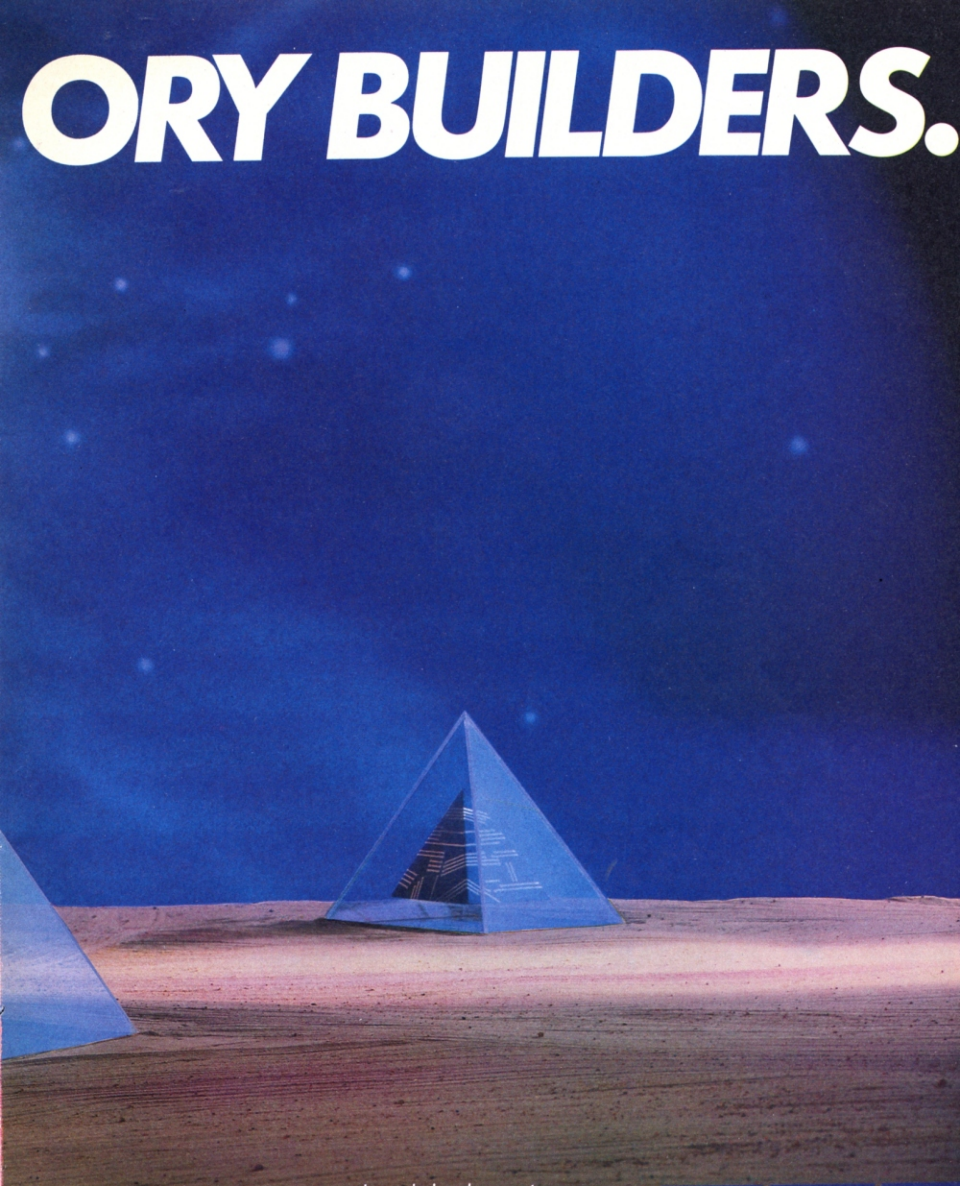

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THE WONDER OF WAFA

Now Spectrum owners can throw their Microdrives out the window, says Stuart Cooke.

The Rotronics Wafadrive offers Spectrum users a better substitute for a real diskdrive than the Interface I and Microdrives ever have. Its far greater reliability knocks the competition into the ground.

First impressions

The Wafadrive resembles the Spectrum (*ie* it's black) and sits directly behind the Spectrum in use. The only connection to the micro is by a ribbon cable which simply pushes onto the edge connector at the rear. The Spectrum edge connector is carried through to the rear of the Wafadrive so any peripherals you may wish to use can be plugged into the back of the drives. Many Spectrum peripherals lack this facility to use anything else with them.

The front of the machine sports two 'wafadrives' — A and B. Between the two drives are three LEDs. One light is used to indicate power on, the other two show which drive is on. A power light is a good idea — how often have you left your Spectrum cooking overnight?

Rotronics has not developed its own drives for use in the Wafadrive but has instead chosen to use drives that were already manufactured. The drives were originally developed for industrial applications by ASTEC/BSR; BSR is a name that should be familiar with hi-fi buffs. Obviously, because the drives are intended for industrial use, they have to be extremely reliable, which is definitely one up on the Microdrive.

The cartridges used with the Wafadrive resemble the Microdrive cartridges in method of operation. The continuous loop of tape held inside is used to store your programs on. The Wafadrive cartridges are about twice the size of a Microdrive cartridge but much more robust.

When removing a cartridge from a drive, a cover automatically protects the tape from prying fingers, dust, and ball point pens. Again, the professional finish of the cartridges is because they are designed for industrial use. According to Rotronics the tape's life expectancy is in the region of 5,000 passes: with normal use your cartridge should last around five years. Rotronics claims that with careful use the life expectancy of a cartridge is more likely to be twice that. Will the Spectrum still be around in ten years?

On the rear of the machine sit two extra edge connectors. One of these is for a Centronics cable, the other is RS232. Both the connectors are non-standard and you will have difficulty purchasing plugs to make up your own cables. However, Rotronics charges far less for the cables than other manufacturers of equivalent leads. Having a Centronics port built in as standard is a great plus for the Wafadrive. It gives the Spectrum access to most of the high-quality printers without having to buy extra boards for the printer or yet another

add-on. The RS232 both sends data out through this port and also recieves it. So you could link two Spectrum's together, use a modem etc.

The Wafadrive essentially gives your Spectrum the same facilities as one Interface 1, two Microdrives and one Centronics interface put together.

There is no network facility on the Wafadrive, but how many people would have rather had a Centronics interface on the Interface 1 than a network?

In use

The first thing you notice once the Wafdrive is switched on, is you can't use it. None of the Wafadrive commands function so you are left with just a plain Spectrum with a box stuck out of the back.

Before you can use the drive you must initialise it. All you need do is type 'NEW *' and you're away. The Wafadrive sets up all the system variables it requires, and gives you its signing-on message.

This isn't as silly as it sounds. If you have ever used a Spectrum with an Interface 1 attached, you probably know you can't run all the software available. This is because the software uses some of the same RAM as the Interface 1 system variables. The ony way you can run this software is to remove the two screws which hold the Interface 1 onto the Spectrum and remove it. The Wafadrive gets around this problem by leaving the initialisation of its operating system to the user and, until you do this it takes up none of the Spectrum RAM.

tape within the cartridge, formatting takes a different amount of time. This also effects access time when loading or saving programs. The 16K cartridge has a worst case access time of around six seconds, while it can take up to 45 seconds to access a file on a 128K cartridge. These are worst case figures and in practice the access time is a fraction of this.

Checking the contents of a cartridge is simplicity itself: all you do is type CAT*. This displays the contents of the current drive. There are two drives on the Wafadrive and you can specify which one of these is the default or simply name the drive that you want to use. Once you have catalogued a cartridge, any further catalogues are almost instantaneous, as the Wafadrive sets aside two areas of memory to hold the catalogues for each drive and the catalogue has to be read in only once.

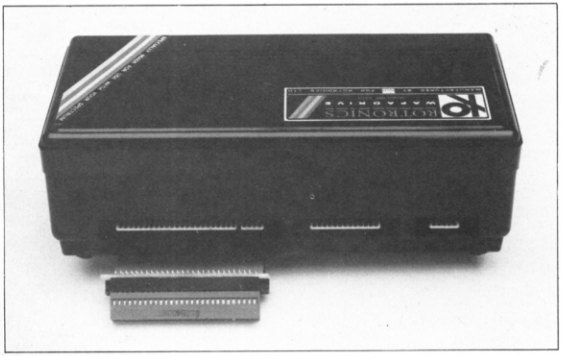
The catalogue of the cartridge gives information on the names of the files, what type of file they are, the size of each file, the number of files on the wafer and the amount of remaining storage.

Loading and Saving programs is slightly slower than the equivalent process using a Microdrive and Interface 1, especially if you are using a 128K cartridge. This is, however, a small price to pay for the greater reliability.

As with the Interface 1, it is possible to open stream and channels to the devices in the Wafadrive. As previously mentioned these are the two drives, the RS232 interface and the Centronics interface. Once I had the correct leads it

Commands for use with Wafadrive

NEW *	Initialises Operating System
NEW #	Clears Basic program
NEW	Clears Basic and OS
FORMAT *"d:wafername"	Formats new wafer
CAT *"d:"	Displays wafer directory
CAT # "d:"	Sets default drive
SAVE *"d: filename"	Save BASIC program
SAVE *"d: name" LINE run	Save with auto-run
SAVE *"d:", start, length, run	Save machine code
SAVE #	Save with replace
LOAD *	Load first program
LOAD *"d: filename"	Load specified program
LOAD *"d: name", start, length	Load and relocate machine code
MERGE *"d:filename"	Merge programs
VERIFY *"d:filename"	Verify program
ERASE *"d:filename"	Erase file
MOVE *"d:name" TO"d:name2"	Copy file
OPEN #*stream; channel	Open stream to channel
CLOSE #*stream	Close stream and channel
PRINT #stream; (string/data/vars)	Send data to stream
INPUT # stream) (variables)	Get data from stream
INKEY $ stream; (variables)	Get character from stream
CLEAR *	Close all opened streams
FORMAT *"R"; baud rate	Set RS232 baud rate
CLS *	Clear screen and reset colours



This means all software runs from cassette even if it doesn't run with the Wafadrive initialised.

As with a disk or Microdrive the tape in the Wafadrive cartridge has to be formatted. This is done quite simply by means of the FORMAT command. There are three sizes of tape available for the Wafadrive — 16K, 64K and 128K. Obviously, due to the differing length of

was only a matter of seconds before the LLIST and LPRINT commands were listing out to an Epson printer through the Centronics port rather than the ZX Printer. To test out the RS232, the Spectrum was connected to a Brother EP44 typewriter and a short Basic program made it possible for any keypress on the Spectrum to appear on the Brother and any keypresses on the Brother to appear on the Spectrum screen. As well as this two-way communication, it proved extremely easy to LLIST and LPRINT to the Brother.

To test the reliability of the Wafadrive, a program was written that would store a thousand numbers on the drives, read them back and then start again. Having left the program running all night, no errors had occured. I wouldn't like to try this with a Microdrive.

Verdict

Would anyone like to buy a secondhand Interface 1 and Microdrive?

Product Wafadrive **Price** £129.95 **Manufacturer** Rotronics **Outlet** Mail order from SMT, Freepost, Greens Norton, Towcester NN12 8BR. Also computer stores.

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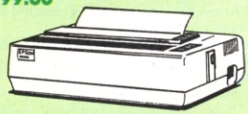

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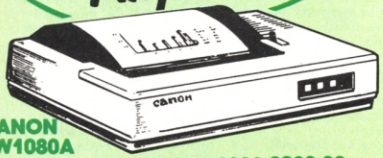

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SOFTWARE PRE-VIEW

We take a peek at the new software packages, and give you a taste of things to come. Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to *Bryan Skinner, Software editor*, PCN, *62 Oxford Street, London W1A 2HG.* Please don't forget to include prices and telephone numbers.

AMSTRAD

Galaxia, a high-speed arcade game, is a shoot-em-up with ten swarms of opponents, featuring multi-key scanning and allowing you to move and fire simultaneously. You control the archetypal spaceship faced with oncoming swarms of alien vessels, including sausages.

The game's certainly one of the best we've seen on the Amstrad on the Invaders theme, but there's not really enough variety to keep you at it.

Galaxia	**£5.95**	**Kuma 07357 4335**

MSX

All the games launched this week give you some idea of what to expect in the way of MSX software prices — they're expensive, and some of the games may not live up to the price tag. *Buzz Off* features Bertie the Bee who has to eat as much fruit as he can. Not original, not brilliantly executed, not very good.

Shark Hunter is considerably better, the animation is quite good, and the theme relatively novel. You take on the role of an Eskimo hunter guarding a fish farm against shark attacks. Hazards also include ice floes which damage the keep-nets, allowing the fish to escape.

The Wreck will be launched soon and we're told it will be a 3D graphical adventure. The titles are being converted for the Spectrum and Commodore 64, and the sequel to *Shark Hunter* is in the design stage.

Buzz Off	**£9.95**	**Electric Software 0954 81991**
Shark Hunter	**£9.95**	**Electric Software 0954 81991**
The Wreck	**£9.95**	**Electric Software 0954 81991**

COMMODORE 64

If you've ever wondered why poor old Bill Stickers will be prosecuted, you may find a clue in Taskset's new game, *Poster Paster*, of which a review will appear shortly.

Mosaic Publishing is now selling games based on book titles. The bespoke software house, Level Nine, is responsible for *Erik*, an illustrated adventure game based on the book by Terry Jones (of Monty Python fame), The Saga of Erik the Viking.

The Stainless Steel Rat based on Harry Harrison's best-selling tales, is programmed by Shards and comes with the book, The Stainless Steel Rat Saves the World.

Scorpio Software has announced two 64 games, both at £1.99. *Builder Ben* offers a multi-screen arcade-type game in which Ben has to construct houses, while under constant attack from rebellious tools.

Bootleg Bandits takes you to the world of hillbillies, moonshine, police roadblocks and helicopters.

Latest from New Generation is an amusing little Wild West number cleverly called *Cliffhanger*.

American Football	**£9.99**	**Argus 01 437 0626**
Hyper Biker	**£7.95**	**PSS 0203 667556**
Boulder Dash	**£8.95**	**Statesoft 0438 317583**
Bristles	**£8.95**	**Statesoft 0438 317583**
Builder Ben	**£1.99**	**Scorpio 061 834 2292**
Bootleg Bandits	**£1.99**	**Scorpio 061 834 2292**
Your Team	**£9.95**	**Marlborough Marketing 061 437 0538**
Cliffhanger	**£7.95**	**New Generation 0225 316924**
Musicalc	**£45**	**Musicalc UK 01 241 2448**
Poster Paster	**£6.90**	**Taskset 0262 673798/602668**
The Saga of Erik the Viking	**£9.95**	**Mosaic 01 228 4463**
The Stainless Steel Rat	**£9.95**	**Mosaic 01 228 4463**
The Nomad of Time	**£9.95**	**Mosaic 01 228 4463**

BBC/ELECTRON

Elite may be simply the best game we've ever seen on the BBC or any other micro. There will be a full-page review in the very near future, as it's very hard to explain in just a few words. It combines arcade, strategy and adventure as you fly around galaxies, trading and fighting.

The graphics are superb, the action fantastic — could this be the first game to get converted to an arcade machine? It certainly ought to be.

Alligata has produced a fair four-screen arcade game for the machine, *Tarzan*, in which you as the ape-man have to dodge your way around various jungle hazards, following arrows, to rescue Jane. The graphics are colourful, if a bit chunky; We're featuring a review very shortly. *Son of Blagger* is just what it says, but it's not half as good as the 64 version.

Micro Power has dropped its BBC/Electron prices from £7.95 to £6.95. As managing director Bob Simpson puts it: 'Price pays an important part in the buying decision.'

Share Analyser is for the investor, but you have to enter information as DATA statements. The program will provide share movement analysis, portfolio profit statements, and so on. Amending DATA means you have to save the entire program, an odd approach for such software.

Systematics International is turning its attention to the BBC. The company is well-known for Apple, ACT and IBM PC software and is now selling a suite of financial accounting packages for the Beeb. The packages are sold in pairs — 'duos' — and the sales ledger offers up to 400 customer or supplier master accounts and 750 transaction detail records.

Elite	**£15**	**Acornsoft 01 379 7538**
Tarzan	**£7.95**	**Alligata 0742 755796**
Son of Blagger	**£7.95**	**Alligata 0742 755796**
Sales and Purchase Ledger	**£89**	**Systematics 0440 704131**
Stock Control and Invoicing	**£89**	**Systematics 0440 704131**
The Saga of Erik the Viking	**£9.95**	**Mosaic 01 228 4463**
Share Analyser	**£14.95**	**Synergy 01 626 1567**
Your Team	**£9.95**	**Marlborough Marketing 061 437 0538**

SPECTRUM

American Football comes from Mind Games and should provide hours of fun for sports enthusiasts. You'll certainly need the game's 15 page booklet explaining the rules. But the screen display is a far cry from other cricket, tennis and football simulations we've seen. It rather lets the side down.

The Journey is Temptation Software's latest release. It's an adventure with graphics; the aim being to find the white ship of the elves which will carry you to a distant land where your true destiny as an adventurer will be revealed. As with Valhalla, the way the characters treat you depends on how you conduct yourself, and they have lives of their own.

In each location you're presented with a description of the place, objects present, and exits. Sometimes this is preceded by a simple graphics representation. The phrase analyser seems a bit simple — it's restricted to simply verb-noun combinations. A full review is on its way.

The Saga of Erik the Viking	**£9.95**	**Mosaic 01 228 4463**
The Key to Time	**£5.95**	**Lumpsoft, 17 Hardrow Road, Leeds**
The Journey	**£7.95**	**Temptation 0797 223642**
American Football	**£9.99**	**Argus 01 437 0626**
Cloak of Death	**£7.99**	**Argus 01 437 0626**
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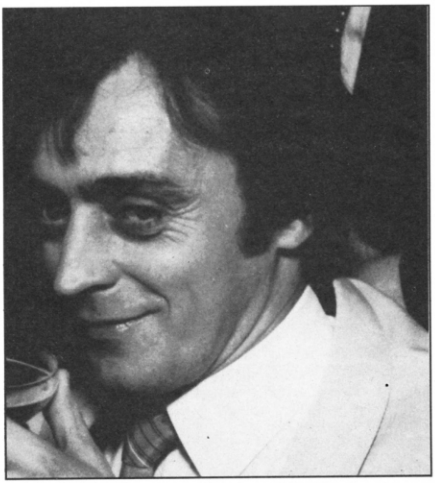

Michael Wheeler is an articulate, good-looking businessman in his mid-thirties. Born and bred in London, his work has taken him all over the world. Despite his busy life-style he found time to marry, but unfortunately his marriage failed and he found himself back in London, trying to rebuild his social life.

'My cousin, who lives in London, suggested that I should join Dateline. I must admit, I found the idea appealing because I was aware of Dateline. In fact, I had been a member way back in the sixties. I found no great romantic successes at that time but many, shall we say, nice encounters, so when my cousin suggested the idea again I thought 'Why not, I'm only going to live once, why not make the best of it?'

Michael didn't join Dateline to find 'the woman of my dreams'. 'I joined because after a long absence from a city like London you tend to find that your friends and acquaintances have married or moved away. Although I obviously missed female company, I also found that I had no circle of friends left at all.'

'When my first list of names from Dateline arrived and I began to receive calls from women with whom I had been matched on the computer, my social life improved out of all recognition almost overnight! My only problem was time, because all of the women I spoke to were so pleasant that I felt I had to meet them. In the event, I met four from my first list of names. Two I felt I could quite happily be friends with; the other two meant rather more.'

Michael doesn't mind people knowing he is a member of Dateline. 'There's not the adverse reaction from family and friends that I think some people may expect,' he said. 'I did perhaps feel, as many people probably do, that there's some sort of stigma about admitting to feeling lonely. But that's rubbish as loneliness affects every person at some stage of their life, no matter what their circumstances. It's something that has to be overcome by any means available to us. Dateline may sound cold-blooded to some people, but I have found it certainly isn't. It may perhaps be more socially acceptable to meet people of the opposite sex in pubs or clubs, but really Dateline wins above those places. I don't like competing with smoke and noise, and it's far nicer to know that the woman you're telephoning has the interests and desires you're looking for. It provides a basic understanding before you even say hello. Obviously, all the usual problems of man meets woman are still there, but you have conquered quite a few of the barriers that so often make a relationship fail before its really started.'

He stopped to consider for a moment. 'I don't know what you need from life. All I really want is happiness, and a large part of the happiness I seek is the happiness that can be gained from the relationship between a man and a woman. At least two of the women I have met directly through Dateline have become friends and it's good to know that if I am at a loose end there's someone I can 'phone for a chat or to arrange an evening out.'

Michael has recently suspended his membership of Dateline. He has met a young woman who is a friend of one of his Dateline introductions. Their relationship has blossomed into love and they are now engaged to be married.

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- ☐ Good food
- ☐ Politics
- ☐ Classical music
- ☐ Art/Literature
- ☐ 'Live' theatre
- ☐ Science or technology
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- ☐ Poetry
- ☐ Philosophy/Psychology/Sociology
- ☐ History/Archaeology
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VINTAGE VOYAGE

The best educational software comes from the educationalists. So says Mike Gerrard, who voyaged Into the Unknown.

You don't have to be Longman, Penguin or Macmillan to produce excellent educational software, as Tressell Publications' *Into The Unknown* proves. The package pulls its weight to set standards of excellence — which were sadly lacking before computer assisted learning fell into the hands of educational publishers, where it belongs.

Tressell already produces worksheets on historical subjects for schools: now they've produced a computer simulation of a 15th century voyage of discovery.

Documentation

The package comes in an A4-size plastic wallet containing a handbook for teachers or parents, 12 information sheets covering different aspects of the voyage, and 20 blank exploration charts — for a small class or a very large family.

Getting started

With such a wealth of background material at hand it might seem daunting, but in fact you could simply load the program straight off. Side one of the cassette contains the *Preparations* program, covering five topics (*The Unknown, Travellers Tales, The Ship, Supplies* and *Navigation*).

At this stage you could get by without looking at the other material, but it's more interesting to go the whole hog. A little preparation before embarking on Side two *Into the Unknown* is essential.

In use

Preparations allows you to run through any of the topics, each of which presents you with several screens of information, using text and graphics. At the end of each is a quiz in which you earn points for the voyage itself — a measure of how prepared you are before embarkation.

The section on *The Ship*, for example, shows the construction of a typical ship of the time, labelling the types of sail and so on, informing you that your ship for the voyage is a Caravel. You then answer ten questions on what you have just learned. At this point you might want to refer to the several wall posters, including a map of the known world in the 15th century.

To head out on your voyage into the unknown, you need one of the blank grid sheets, 25 × 33 in size, and you can start on any square from A1 to H1. When you input the grid reference, the computer tells you what is in that square, then you input an adjacent square to move into. Instructions are given on how to fill in the grid to record the progress of the journey, the discoveries you make and the hazards encountered.

The program makes amusing use of graphics. Your vessel is Portuguese, and if you find yourself near a Spanish island you're bombarded by a cannon, while in another square you might be confronted with a body: 'Burial at sea: A crew member has died of scurvy, yellow fever, or malaria. It is your duty to bury him without delay.' Elsewhere you might get chased by a Spanish ship, or discover an island and claim it for your country, earning yourself points towards your final total.

For parents or teachers there is a master chart that shows which squares bring storms, islands, Spanish ships, shipwrecks: 19 likely items in all, including many randomly scattered about the map.

When the armchair voyagers reach a coastline, they must plot it on their map, then perhaps try to follow the coast to discover a harbour or landing place. Plotting the coastline reveals where it is that they are exploring, but without the master chart the simulation really is like a voyage of discovery as you do not know what will be over the horizon in the next square. If you find yourself crossing a desert, you must decide whether to continue or to return to the safety of your ship and sail on.

What is unfortunate is that many squares are necessarily marked just 'open sea.' Since nothing happens in these, the graphics routine to depict them should be one of the briefest, but it is, in fact, lengthy, and involves your ship sailing from one side of the screen to the other, followed by a seagull fluttering about for a few seconds.

The graphics are not spectacular by games standards, but they're reasonably well done, mostly animated, and the use of sound adds to the interest. For many activities — dealing with diseases, trading with natives and so on — you're referred to the information sheets: all in all, this is a comprehensive package.

Verdict

This is how a micro should be used as an educational aid, and the mass of background material adds to the authentic feel of the voyage. Though expensive by home software standards, *Into The Unknown* is a more worthwhile investment than three or four below-average pieces of so-called educational software.

Name Into the Unknown **System** 48K Spectrum **Price** £22.56 **Publishers** Tressell Publications (0273 561464) **Format** Cassette **Language** Basic **Other versions** BBC, Commodore 64 (disk versions available) **Outlets** Mail order (£2 postage).

REPORT CARD

Features	○ ● ● ● ●
Documentation	● ● ● ● ●
Performance	○ ● ● ● ●
Overall value	● ● ● ● ●

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BRUSH UP YOUR CODES

Simon Williams gets to grips with a new version of the Devpac assembler/ disassembler for the Amstrad CPC 464

When a new computer appears programming enthusiasts look for two things. The first is the quality of the high level languages available for it, and the second is the quality of the low level programming aids.

In the case of the Amstrad CPC 464, which uses a Z80A processor, the Assembler/Disassembler offered by Amsoft is a version of the well-received *Devpac* package from Hi Soft (Spectrum version reviewed in *PCN* issue 43).

Features

Devpac comes as two separate programs, Gena to handle assembly of Z80 source code and Mona, a machine code monitor and disassembler. These can be loaded at any point within the memory map of the computer and work independently of each other. The assembler is a full two-pass program which supports a number of assembler directives to define bytes, words and strings and the entry point for calling routines from other languages.

The monitor offers the usual 'front panel' display together with a breakdown of code in memory, and the ability to perform hex dumps to screen or printer. It is also possible to disassemble existing machine code to edit it and then reassemble it through Gena.

Presentation

Devpac comes on cassette with a copy of Gena on one side and Mona on the other. The manual advises you to load Mona first if you want to have both programs in the machine at once. Perhaps it would have been useful if this program was on side one of the tape.

The manual meets the high standard of Amsoft documentation and has 52 loose leaf pages bound in a ring-file. The text includes details of all the commands for both programs and worked examples of their use in programming. But, alas, there's no index.

In addition to the documentation, Gena has a Help screen briefly indicating what all the single letter commands do, but not showing their syntax. The screens in both programs only display in the standard Amstrad livery of yellow on blue.

This is a pity, since Mode 1, which is used throughout the package, allows up to four different colours. As lines of text and code on the Amstrad screen sit with only one pixel between them vertically, use of colour highlights could have made the displays much more readable.

In use

Both programs are preceded on the tape by a loader which requests the load addresses for the code. Suggested defaults are given in the manual and on entering these the programs loaded without trouble.

The assembler signs on with a display of its Help screen and the normal '>' prompt. To enter source code, you have to enter the I command, with optional parameters for startline number and step — they are numbered automatically. Standard Z80 mnemonics are used, but no error checking is carried out until you try to assemble the code, using the A command.

The code is pretty thoroughly checked at this stage and errors or warnings are issued appropriately. It's worth mentioning that all entry must be done with Caps Lock selected on the keyboard, as Devpac will not recognise the source otherwise.

Having assembled the code you can run it from within the Assembler. Other facilities include searches, block moves, relocations and printing or saving of both source and object code to tape. You can jump from Gena to Mona and back, but only if the other program has already been used at least once.

The front panel display of Mona shows details of the CPU registers, a breakdown of 32 bytes of memory and the stack (at least this is what I believe it to be — I could find no details in the documentation). From this display it's possible to produce a disassembly or hex dump of any section of memory, to single step through a section of code or to insert breakpoints and run through the code to these.

Memory may be updated from the keyboard, and this includes the direct entry of strings of ASCII codes. Decimal/Hex conversions can be done simply and the front panel itself may be displayed using either number base. Block moves, searches, copies and fills can also be done and sections of code may be executed from any address.

Verdict

Although the features of Devpac are comprehensive and it will do most of what you want, it's rather slow when updating screen displays. I also found Mona's memory display annoying as it as it blanks and rewrites every time you move the memory pointer, even by only one byte backwards or forwards.

This, of course, doesn't affect its function, but it's not one of its most friendly features. The mnemonics of both programs are designed as memory aids, but inevitably some functions are performed by fairly arbitrary letters.

Overall, Devpac will prove a useful aid to writing machine code on the Amstrad, but it should be used with care. Without trying too hard, I succeeded in crashing the system at least once. It seems a shame that more of the significant features of the 464 couldn't have been incorporated in the translation.

REPORT CARD

Features	○●●●●
Documentation	●●●●●
Performance	○○●●●
Value for money	○●●●●

Name Devpac **System** Amstrad CPC 464 **Price** £24.95 **Publisher** Amsoft, (0277) 230222 **Format** Cassette **Language** Machine code **Outlets** Mail order and dealers

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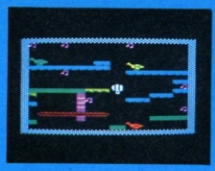
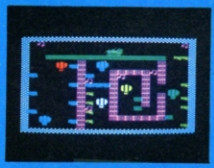
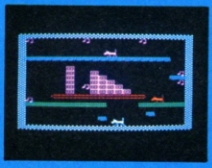


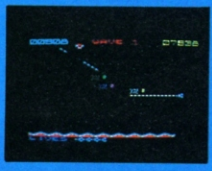


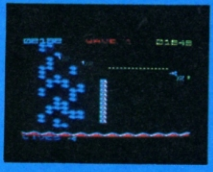


Oh what a night, drinking, dancing and singing 'til dawn. Now it's time for all the revellers to make their way home. Being a little worse for drink, you decide to walk home in the cool night air, rather than taking a taxi. Singing merrily along the way, you walk through the park and skip lightly over the ducks and catch the notes of music that seem to hang in the air. But be careful when approaching the railway, trains still run at this time of day and wild dogs are in search of food! When you have collected all the notes on the level you are on you will proceed to the next, collecting a time bonus on the way.

Miner Willy's first outing on the Commodore VIC 20.

Available on the VIC 20 + 16K expanded

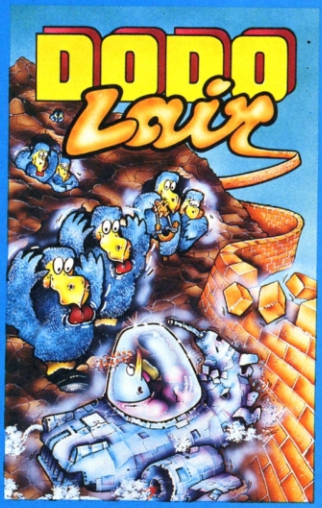




Its army to enormous dimensions, soon its attack on mankind will commence. Exploring the outer regions of a weird landscape, your secondhand 'ground skimmer' has only a single laser in its armoury. Discovering the Dodo's secret means you must destroy as many beings as possible, as the Dodo will try anything in its power to prevent the secret getting out. The game has 9 attack waves with progressive difficulty and speed. There's a bonus life every 10,000 points and bonus points after every wave, dependant on which level you are on (Bonus = Wave Number x 1000). After the wave bonus the Dodo must be hit 12 times, by bringing the number on the right of the score from 88 to 100. The number of 'Mults', 'Wallys' and 'Buildas' is also dependant on the wave number.

WARNING: 'Mults' are not affected by laser fire, but in fact, feed on it. The 'ground-skimmer' can be destroyed on collision with any enemy or enemies weapons, or by letting the 'BBs' (purple coloured enemy) getting to the far right of the screen.

Available on the unexpanded VIC 20



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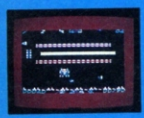
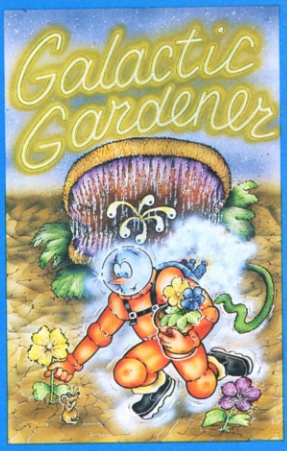


Deep in the kitchen of one of the towns first class restaurants amongst the hustle and bustle, Little Thwitchy Thwilly has just been selected from the aquarium as a customers main course . . . panic . . . sitting in the oven his first thought is survival and how to escape. As the oven is ignited and the flames start to rise he realises his only hope is to collect the dripping condensation from the pipe at the top of the oven and try to extinguish the flames. It's going to be tough, he must survive through ten different ovens and face added hazards such as the rotating spit, spinning food debris, oven foam and the restaurants pet dog, Fatty Schizo Henry, who by the way often enjoys a snack from the restaurants aquarium. Can you help him?

Available on the unexpanded VIC 20

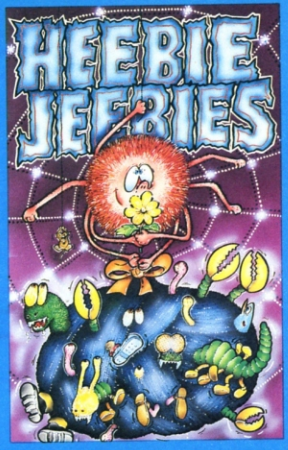


Once you were the head gardener in charge of a group of ten power-flowers. These have been stolen and hidden in a set of caves, from which you must retrieve them. The flowers are protected by forcefields, gates, begonias and patrolling snap-dragons. Be careful as the flowers are poisonous and you must find a pot to put each flower in before you try to pick it up.

The beans in the cave are harmless and extra points will be achieved by picking them up along the way, but don't touch their stalks.

If anything is touched other than a pot, beans, fuel dumps for re-fueling, sprays which can be used to stun the snap-dragons, or a plant if you have a spare pot, the result will be that you are teleported to the start of the game. It is possible for you to leave your transported back to your teleport. You begin the game with four teleport charges and an extra charge is gained for every flower collected.

Available on the Commodore 64



You play the roll of a spider in this extremely compelling game and you are faced with escaping from some very perilous situations.

You are trapped in a hole from which you must escape, but there are other insects in the hole which make your task more difficult, as contact with any of them will lead to instant death. However you are not totally defenceless you are capable of leaving a web trail which only snails can cross. By collecting the twigs that are littered around and storing them against the left hand side of the hole between the two stones a bridge will form and you will be able to climb out. But be careful — there are 15 hazardous situations to contend with — each one more difficult than the last.

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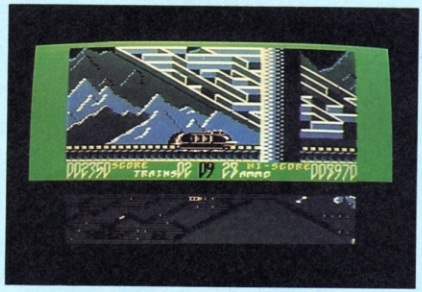

COMMODORE 64

SUICIDE EXPRESS

Tony Crowther is probably the UK's best 64 programmer with several masterpieces under his belt. Now, working with Gremlin Graphics, he's written *Suicide Express*. Ok, so it's a sort of Son of Loco idea, but the implementation and execution are streets ahead.

The game uses a fast loader. There are 15 levels of play, but you must start off below level 10. Rumour has it that reaching a very high score makes the train take off.

At the foot of the screen is your score with an ammo count, level indicator, number of trains left and so on. Above this is an aerial map of the track layout, largely in black and grey. Your train is an orange and white rectangle, and in pursuit are a purple hovercraft, green and white planes and grey motherships.

Ammo to be collected appears as white dots which move to and fro. Tunnels are shown as blue. Above this is a superb side-view of the train. As you move along, telegraph posts pass by and the background scrolls smoothly past. Trees, derelict buildings and mazes hurtle past. The detail is nothing short of superb.

You can increase the speed by moving the joystick to the right, left slows you down and if you stop you can freeze the game. Passing over ammo collects it, but if you exceed 40 units, warning bells sound. You're well advised to fire a few times to avoid critical mass.

Pressing the fire button launches two missiles — a rocket skims away forward while another pops up, flips over and zaps off backwards. All too often the hovercraft sneaks up from behind and if you don't switch tracks to dodge it you'll see your train rotating in three separate pieces. Let this happen three times and that's your lot. It's best to dodge the hovercraft, then blast it from behind for extra points.

Each time you pass *Gremlin* carved in stone in the background you hop up a level, and that's when the fun really starts. This is where you need your retro-rockets since the planes which scream in from your rear will drop bombs which can only be destroyed by your rockets — and as the bomber's aim is spot on, it's as well to hammer on fire when you see a plane.

You can't shoot the planes down, but the motherships pose a different problem. Hit them and they dive for you, so a good tactic is to shoot and stop dead so they flash past safely overhead.

The background music is from the Sky 2 album, and is nicely done. There's even a voice synthesis feature which announces the start and end of each turn, as well as spelling out your score.

All in all this is a superb game. It's difficult and the graphics are superb — some of the best you'll see on the 64.

Bryan Skinner

Price £9.99 **Publisher** Gremlin Graphics 0742 753423

SPECTRUM

MISS

MADHATTER

The best computer games drive you mad as a hatter. In this one you start off that way. playing the part of Lewis Carrol's character who had a penchant for tea parties.

Being loopy, he's not too good at pre-party planning so the aim of the game is to collect up treats to feed the impending guests.

Using a Kempston joystick or keys you control the animated character of the hatter as he roams the screen to gather up the ten scattered sweets. At the bottom lies a chocolate roll, but the ten sweets come first. Unfortunately, mice run across the screen and swallow them. You're not allowed to phone for Rentokil but must just keep out of their way (a collision is deadly) and wait for replacement sweets to pop up. There is some mouse poison floating around, but as it poisons you and has no effect whatsoever on the mice it's not a lot of use.

Two more hazards on the first few screens are a pair of vacuum cleaners. Again, contact is deadly, but grabbing one of the plugs that floats across the screen freezes them. Later a bouncing ball ricochets about the screen.

The more chocolate rolls you snaffle, the more the pace hots up. There's also a high-score table.

The graphics are far from wonderful, with vacuum cleaners looking more like a pair of moon boots, though the Mad Hatter does at least have a pair of short fat hairless legs that move up and down. With merely average sound, the game is also very repetitive as you'll soon get sick of collecting one sweet after the other.

Buyers would be mad as a hatter to prefer this to anything currently in the Spectrum top twenty.

Mike Gerrard

Price £5.50 **Publisher** Gamma Software 01-459 2652

SPECTRUM

GIANT'S REVENGE

What goes up must come down. Thor's successful *Jack and the Beanstalk* had you climbing to the top of the plant whereas *Giant's Revenge* has you heading towards the root, through the hole left by the giant when he fell to earth.

The game has seven screens. Starting at ground level, you descend through various chambers to the giant's subterranean lair among the beanstalk roots. Each screen holds a valuable object which must be snatched before you can progress further. Various meanies scuttle around each chamber — and you have nothing but nimbleness to prevent you from being knocked into the abyss below.

The game can be played using the keyboard or Kempston joystick and also emits an assortment of spoken comments if you attach a Currah Microspeech unit.

At start-up, the game flicks through all the screen layouts, including the options page. Unfortunately, it skips through the latter so quickly, you barely have time to see what key you need to press to select the appropriate option (1 for keyboard, 2 for Kempston, in fact).

On screen one, Jack, a small yellow figure, stands outside his house at the foot of the beanstalk. Hanging about nearby are two unrecognisable but dangerous thingies. A ladder leads down a hole to a cave where two more beasties patrol. If you use the Currah Microspeech, you'll be told to collect the enchanted scroll which is lying centre-screen.

Jack can jump as well as move left, right, up and down. He does suffer somewhat from colour attribute problems, frequently leaving a blob of yellow in areas he has visited. The animation is not bad but controlling Jack is a pain. It's all to easy to blunder into a monster or fall off a ledge.

Other screens feature a stalactite and stalagmite-filled cave, planks across a lake, the giant's chamber and finally, the giant's lair, complete with giant (well, his head anyway). The backdrop graphics are the best feature in what is otherwise a pretty ordinary and awkward game. A non-runner bean.

Bob Chappell

MISS

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GAMEPLAY

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JET POWER JACK

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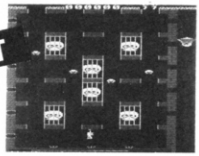


There are several 'platform-type' games around at the moment, but few run on the BBC because of its limited memory to store information for the different 'rooms'. *Jet Power Jack* overcomes this problem by making each level a separate game in its own right.

The basic concept of this game is to fetch a fuel pod from one side of the screen and return it to the flying saucer on the other. To do this you have to avoid a number of elevating meanies and the electrified ends of the platforms themselves. Add to this a jetpack with an on/off control and you have the basis of the game.

To control the game is simple. The CTRL and A keys move you left and right and the RETURN key fires your jet pack. The five screens offer quite different scenes, and you'll need some good tactics to complete them successfully.

The first is a simple platform hop: you have to avoid aliens which rise and fall between the platforms and bats which hang from their undersides. The second allows more freedom of movement, but you are at the mercy of your rather independently-minded backpack. The third is more like the first, except that a number of caged nasties limit the platforms on which you may make a landing. The fourth screen is similar to the second, but harder, and the fifth features Wilfred the hideous Yugg monster.

You are in flight virtually from start to finish on this one. If you complete your task on any one level, you are off again on the same screen, picking the fuel pod from a new vertical position on the right and returning it to the saucer, positioned randomly on the left.

While it's not original, Jet Power Jack runs a nice line in humour and, despite its simple controls, proves to be an entertaining and addictive game. The graphics are smooth and the sound is interesting. Well worth looking out for.

Simon Williams

Rating 8/10
Price £7.95 (cassette)/£9.95 (disk). **Publisher** Micro Power, Sheepscar House, Sheepscar Street South, Leeds LS7 1AD

COMMODORE 64

CHILLER

Here's a game that's real value for money at £1.99. And if Mastertronic can keep this up, it's bound to bring a few software houses to their knees.

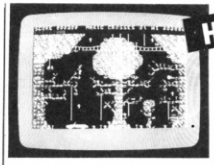
Chiller is based loosely on the video *Thriller* and even boasts fragments of Michael Jackson's hit song as part of its interrupt driven background music.

Your task is to rescue your girlfriend from the haunted house to where she fled in terror. To do this you have to work your way through five screens, then back again with your mate. Not an easy task, especially when to move from screen to screen you must collect all the flashing blue crosses on the screen, and avoid the various nasties which move around the scenarios. The hardest bit is getting back — here you have to take alternate control of hero and girlfriend — not easy.

The opening scene is the forest, here skeletons wander, spiders descend and you have to learn quickly to distinguish between energy-giving and deadly mushrooms. Next comes the cinema; avoid the knight patrolling at the foot of silver screen, the hail of pop-corn, hop over the seats, collect the crosses and it's off to the ghetto.

The ghetto shows a tenement block in profile, and you can ascend by jumping from window ledge to window ledge. But, watch out for the birds which fly across from time to time. After this comes the graveyard, and finally the mansion where more ghouls await.

The main niggles of this game are that the screens are in the wrong order. The cinema's is easiest, but it comes second. Joystick response is sluggish at times and the action in the scenes is rather similar, leap from ledge to ledge, branch to branch or whatever — all variations on the platform theme. Apart from that, the graphics



HIT

are quite well done, the sound reasonable and at £1.99 with a fast loader, it's a steal.

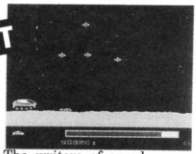
Bryan Skinner

Rating: 9/10
Price £1.99 (cassette), £5.99 (disk) **Publisher** Mastertronic, 01 402 3316

BBC B

DUNE RIDER

HIT



The writers of arcade games have continually tried to keep the invaders theme alive by adding variations. Eventually, someone came up with the idea of putting the laser cannon on a 'buggy' and placing rocks and lava pools in its path — and hey presto a new type of game was born. Now Micro Power has come up with a version for the BBC, available on both cassette and disk.

Keep on trucking might be a good sub title to *Dune Rider* since, if there is an end to it, other than annihilation, I've yet to find one.

The disk version was sent for review and it is certainly a joy to load a game in this form. Micro Power has made good use of the extra space available to include various title screens and adverts for its other BBC games (but demo versions would have been even better).

The game starts with a small animated sequence as our hero runs from his base and boards the buggy. The vehicle is a good size and comes complete with 'go-faster' stripes.

The ability to go faster would come in very handy in the following action, since all forms of highly-coloured aliens descend from the heavens, hell bent on destroying anything moving on the planet's surface. Controls allow acceleration and braking in a similar fashion to 'Scramble', they let you fire forward and upward and bounce the buggy over the radioactive rocks and lava pools that litter the road ahead.

The response is good and the vehicle is very well depicted with all visible wheels following the contours of the ground most convincingly. There are enough different aliens to keep things interesting.

Although the game is very well written and generally enjoyable to play, the lava pools are just too small to be spotted when your eyes are busy on other parts of the screen. Definitely one for the nine-eyed Droomer Beast of Yasrog.

Simon Williams

Rating 7/10
Price £7.95 (cassette) £9.95 (disk) **Publisher** Micro Power Ltd., Sheepscar House, Sheepscar Street South, Leeds LS7 1AD.

COMMODORE 64

ZETA 7

Can you rotate your pod with your joystick? That's what you need to do in this space shoot-out in the heavens over *Zeta 7*. Pod-rotation is only a part of it as you must also obliterate the endless waves of alien hordes and potential Zeta eaters.

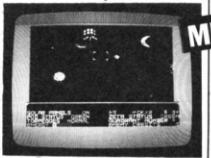
Zeta 7 is actually a defence sphere which you can see on your screen. But you can rotate through 360° horizontally to take in a glimpse of other planets as you go.

To kick off up flicks a demonstration game and instructions. If you leave the keyboard alone you get a cross between a demo and a title screen with excellent electronic music. As it is, the sound effects aren't bad, expecially the deep rumble of a warning you get when Zeta 7 is under fire from the enemy.

The graphics are not particularly stunning, but the screen does scroll round smoothly while the enemy ships zip about.

As well as firing at you and your pod, the enemy can turn sideways on and fire at Zeta 7, so as well as protecting your own hide you have to ensure that Zeta survives. The alien ship also hurl bolts at you.

Predicting which way they're going to jump sometimes results in a direct hit. Your best bet is when they decide to rest.



MISS

Rating: 9/10 **Mike Gerrard**
Price £7.95 **Publisher** Mogul Software 01-734 6080

GAMEPLAY

AMSTRAD

GEMS OF STRADUS

Kuma has started to produce software, to be marketed by Amsoft, and one of their first offerings is a graphic adventure called *'Gems of Stradus'*.
The main objective is to discover the wealth of 'AM'. But, as with most adventures, there are a number of other problems to be solved which are posed by snakes, ghosts and other nasties.

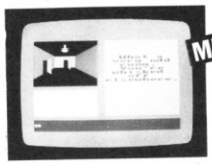
Once loaded the screen gives instructions about commands allowed and how to move around from room to room. The main display shows three text and one graphics window. As well as a picture of each room you enter, there's also a window for reports, another for error messages and a strip along the bottom for the input of commands.

You move around Stradus using the cursor keys, and commands may be stacked in the Amstrad's keyboard buffer so that you can move quickly from one area to another. If you don't know where you're going, you can land in trouble.

The room display itself shows the three walls and associated doors. Rooms can be distinguished by the colour coding of their walls, with each room having a different scheme – (the Great AM is obviously a dab hand with a Dulux colour chart). Objects are cunningly displayed in set positions on the floor of the rooms, which means that they never overlap.

The command interpreter is a fairly basic example of the species, recognising only two word entries and not responding to useful commands such as "DROP EVERYTHING". It does, however, check for foolish entries, like trying to walk through solid walls or locked doors.

A maze adventure is hardly a new concept, and there are certainly games with better graphics than Gems of Stradus, but for all that there is something rather appealing about



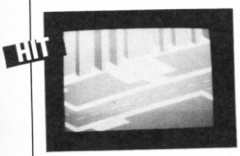
the game. As an adventure, it's not easy, but the puzzles are logical and the input routines seem pretty bomb-proof. Worth looking at until some more advanced graphic adventures come along for the 464.

Simon Williams

Rating: 6/10
Price £8.95 **Publisher:** Amsoft, (0277) 230222

COMMODORE 64

HAVOC



Havoc is a decent facsimile of Zaxxon. The object is to reach a base before it gets destroyed, avoiding various perils on the way.

The screen shows a stylistic 'urban' scene — blocks of green, grey roads with white dashes down the middle, and a backdrop made of big monolithic structures with blue open spaces between them. You're shown as a delta-winged fighter and below is your shadow, which changes as you bank left and right via joystick control. But I found the 'forward to dive, backwards to climb' combination hard to get used to at first.

Once you've taken off, and begin to glide serenely about, you come across the first hazard — enemy fighters. These aren't portrayed very well and look like WWII V1 rockets. Surprisingly the fighters don't fire at you, or chase you but they can be tricky to avoid and difficult to shoot down, especially if you've moved up to the right of the screen.

With regards to the other hazards, keep an eye on your shadow to help you get your bearings. Once past these you're up against a hail of gargantuan black bombs which descend at a rate of knots, their mission to make a pizza of your plane.

If you want to know how well you're doing, dive down and taxi, your wing-tip lights flash, and the screen display clears to a 'Statrep' (Status Report) which shows how much damage has been done to your craft and the base you're trying to reach.

Should you dodge the bomb phase, a wall blocks further movement. At the base there's a narrow aperture and manouevring through this without losing those useful wings is no picnic.

Through the hole lies a similar screen, but obviously it's a lot harder.

The graphics are good and clear and the scrolling impressive.

However, the action's a bit limited and the left/right joystick response was sometimes a little sticky. Even so, it's not an easy game and certainly worth a look.

Tim Brown and Bruce Preston

Rating: 7/10
Price £9.95 **Publisher** Dynavision Productions 0582 595222

BBC B

KAROS

Starting out from the stone gateway that leads to the legendary island of *Karos*, you seek out the legendary Talisman of Khoronz. Then you must return to the gateway, collecting up any other treasures you may have found on the way.

The cassette packaging gives an interesting preface to the adventure, together with some information on commands and objects. The game starts at the gateway, a sort of mini-Stonehenge, from whence you must venture forth using the odd command BEGIN.

Although I soon passed through a considerable number of locations and my map had begun to look quite complex, it was all a bit tame. Having explored over 60 different places, none of them terribly exciting (moors, forests and clifftops for the most part), I had only come across a handful of objects and no puzzles. As the adventure is supposed to contain some 250 locations and 62 objects, one can only assume that the author has stored all the exciting stuff a long way from home.

Not only were there precious few objects to be found initially, but nothing much in the way of incident or mystery occurred either.

The vocabulary used is quite wide and you are allowed to enter complex, though not compound, commands. However, the usual verb plus noun command is the quickest way around this adventure. The terrain is mostly logical and consistent so that going north then south will bring you back to the same place.

Karos is simply not in the same league as Acornsoft's earlier and superb *Philosopher' Quest* or *Castle of Riddles*. It fails to grab one's interest from the beginning. It does get better the deeper you go, but life's short and other adventures beckon.

Bob Chappell

Rating: 7/10
Price £9.95 **Publisher** Acornsoft, 0223 316039

DRAGON

CHICKEN RUN

Impsoft's latest offering *Chicken Run* is an energetic arcade game. Farmer Folly has a super egg-laying hen. But his battery farm is plagued by the local fox.

The hen lays eggs, which the farmer can collect only one at a time. The eggs soon hatch into hungry chicks, which greedily gobble up the hen's supply of corn. The poor old farmer can't refill the seed trays quick enough and the unfortunate hen soon runs out of corn. And if that isn't enough to contend with, the fox will eat either the chicks or the hen without batting an eyelid.

You may get three lives and nine skill levels are on offer. The higher the level the faster the game. At level nine the game is almost implayable and I rarely managed to get above level three.

Nice use of colour and sound, and good animation throughout. A pleasure to play.

Jim Ballard

Rating 8/10
Price £7.95 **Publisher** Impsoft, 01-675 5577

First, a question.

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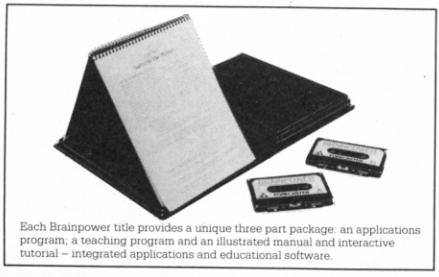

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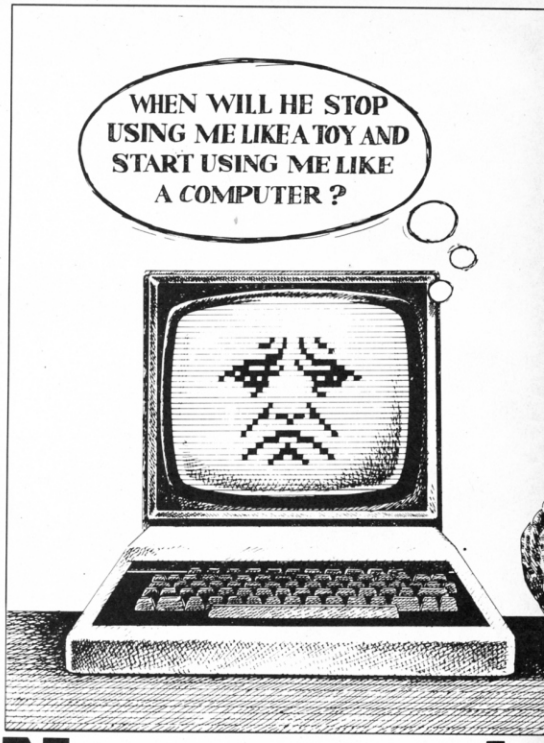

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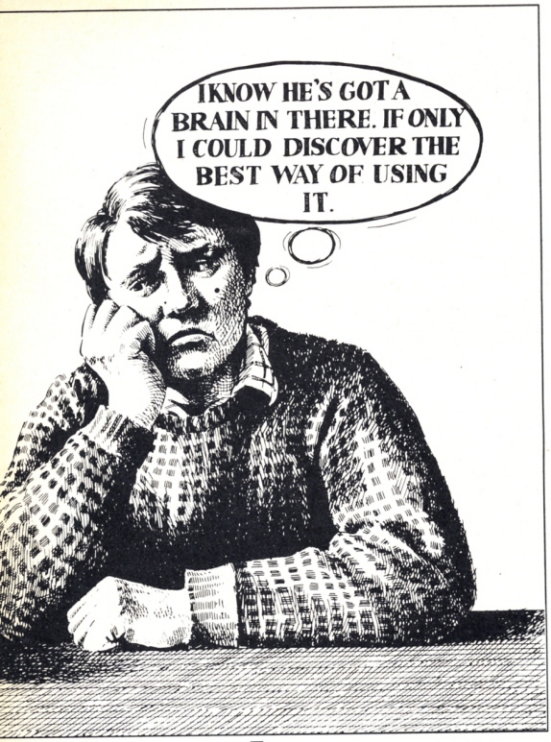

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Wanted Atari 410 cassette and Basic cartridge. Also wanted Atari memory upgrade and any games. Tel: Declan Liddy 0273 558033.

Atari computer software for sale various titles from £4. Also if anyone owns an 822 printer please get in touch. After 7pm. Tel: 584 1151.

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Commodore 64, C2N, Epson RX80. Also Centronics interface, DTL Basic, games & other software. £350. Tel: Cambridge 322 968 after 6pm.

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Commodore 64 software for sale. Over £700 worth, mainly American, including software by Electronic Arts, Epyx, Sublogic, less than half price. Tel: 0292 316729 Kevin.

CMB64 software for sale or swap. Space Pilot, Laxton Pool, Moon Buggy, Pole Position good prices. Tel: 0706 216238.

PAN/PCN CBM64 60 Programs book. Corrected edition £4.50 brand new. Uncorrected edition £2.50 ono. Also some games to sell or swap. Tel: (0590) 683413.

VIC 20/Dragon 32 software exchange. Bored with your software? Want other titles in exchange? Sae for details to David Gilies, 97 Drumossie Avenue, Inverness IV2 3SQ.

Vic 20, C2N, program reference guide, 3 books 4 games £80 ono. Tel: 061 432 3490. 50 Bowerfold Lane, Heaton Norris, Stockport, Greater Manchester SK4 2LU.

Infocom CBM64 adventures to swap. Starcross, Enchanter, Witness, Deadline, Infidel wanted. Will swap for any not listed above. Originals only, please. Tel: Alsager 78676.

Pet 4008, upgraded with 2 32K RAM banks giving 72K total RAM, plus Commander ROM plus reset switches. £250 ono. Tel: Watford 21549.

CBM-64 need trusted person to buy original software and mail to Norway. Radio amateur preferred. Contact Rolf Stranger-Johannessen, Vatneveien 48, N-4560 VANSE, Norway 043/93108.

Commodore 1525 printer hardly used £150. Also Simons Basic cartridge accept £320. Tel: 01-207 1604 after 6.30pm.

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QUIT

Doing a double on Sir Clive . . .

Out and about recently we ran into a parent whose child just happens to go to the school that Sir Clive Sinclair attended in his youth.

'Did you know,' she confided, 'that Sir Clive still takes an interest in the school?'

Well, as a matter of fact, we didn't.

'Yes. He even donated the school some Spectrums,' she continued.

Well there's a surprise.

'And the school went out and sold them and bought BBCs instead,' she said with a triumphant snigger.

As Sir Clive is forever telling us, the Spectrum is an ideal micro for educational use — one way or another.

Esteem or not?

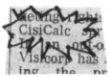
Worlds at War is soon to be released by a new software house trading under the unlikely name of Esteem More Than Equal. The publishers say that all sections of the Spectrum game are 'written in high-speed machine code'.

Just as well. We're getting sick and tired of all those games written in old-fashioned, slow machine code.

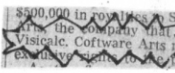
Cisi, Visi, iCsi — fun times for all!

VisiCorp has finally lost its battle with Software Arts over marketing rights to VisiCalc. A barely significant thread in life's rich tapestry, you might think, but the story didn't half give the Financial Times some trouble last week.

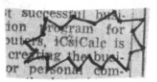
The FT starts off confidently but comes unstuck with the first mention of the package:



The second mention is closer, but by now the problems have spread:



By the third mention, they've given up hope:



Cheap games specialist Mastertronic doesn't let its sense of economy interfere with its press launches. There's no expense spared, as you can see from the quality of the performer that the company brought along to its launch of Chiller. Well, hardly any expense spared. The body popper is not Michael Jackson — it just looks like him. Somebody who looks like a PCN reporter said that he thought at first it might be the Riverend Jesse drumming up votes.

NEXT WEEK

Amstrad various
Springing out of the cover is the spritely Amstrad CPC464, with sprites by courtesy of our high-res Output section.

Output stack
We offer you a Spectrum games designer, a Vic 20 screen designer, BBC utilities and a look at a disk utility for the Commodore 64.

Rats
How does Cheetah's cordless joystick work our in practice? We give it a workout — plus on the peripherals front, a review of the latest in the C64 light pens.

Romantic Spectrum
Look over a new tape utility for your Spectrum from Romantic Robot, and find out how to store Apricots.

SYNTAX ERROR

Several readers have phoned in with the following suggestions for the Amstrad Treasure of Middle Earth program.

An alternative for line 870 is:

870 IF P% = 27 AND B% (12) = 27 THEN PRINT X$ (40): S% (27,2) = 39:S% (27,3) = 28:G$ (22) = X$ (58)

To make the solution (to getting past the man) easier, alter 870 to . . . (R=18 OR R=19)

880 IF P%=27 AND B% (12) <> 27 THEN PRINT X$ (42): RETURN

890 B% (53) . . . SHOULD READ B% (37)

820 R = 17 MORE LOGICAL . . .

1620 Take out comma after asterisks place after word 'pass' ie put two commas after 'pass'.

1320 1$ should be L$

PCN DATELINES

Strathclyde Computer & Business Exhbn	October 2-3	Skean Dhu, Glasgow	GHC Ltd, 041-248 2428
Computer Technol Exhbn — Comtec	October 3-5	Newton Aycliffe, co. Durham	Industry Section, Sedgefield District Council, 0388-81666
Computer Graphics FX Exhibitions	October 9-11	Wembley, London	Online Conferences Ltd, 01-868 4466
Apricot & Sirius Computer Show	October 16-18	Manchester	Paradox Group Ltd, 01-241 2354
London Business Equipment Exhbn — LBES	October 23-26	Earl's Court, London	BED Exhibitions, 01-647 1001
Computer Exhbn — Computers	October 24-27	Johannesburg, S. Africa	Specialised Exhbns, 01-486 1951
Electron & BBC Micro User Show	October 25-28	Alexandra Palace, London	Database Publications, 061-456 8383
Home Tech '84	October 26-29	Exhbn Complex, Bristol	Nationwide Exhibitions, 0272-650465/15
Computer Security Conf & Exhbn	October 29-30	Conf Centre, Nottingham	Elsevier Int Bulletins, 0865-512242
SE Asian Personal Computer Exhbn & Conf — PerCompAsia	Oct 29-Nov 2	Singapore	Overseas Exhbn Services, 01-486 1951
Computers in Action	Oct 30-Nov 1	Anderson Centre, Glasgow	Trade Exhibitions, 0764-4204
Personal Computer Fair	Oct 30-Nov 1	Town Hall, Bournemouth	Mike Schofield Promotions, 0202-36899

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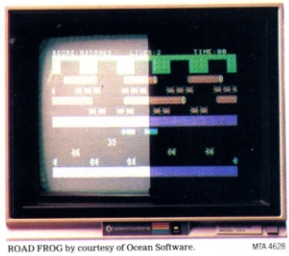

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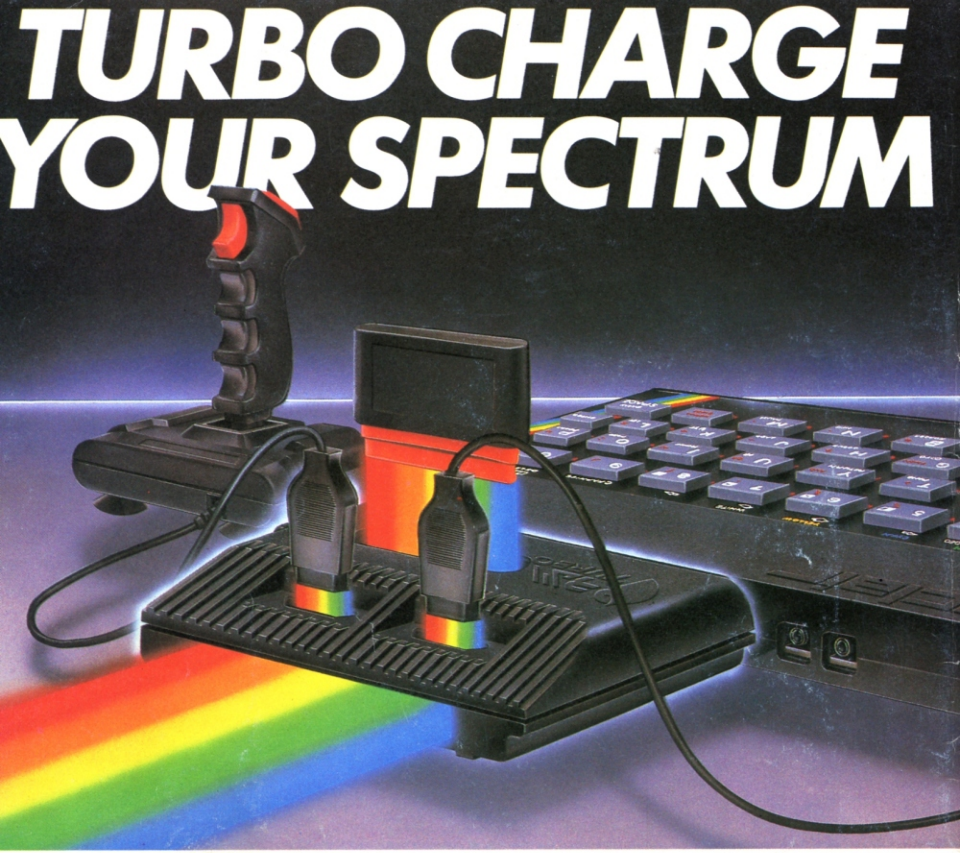

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